Sir William Petty, Political Arithmetic, and the Transmutation of the Irish, 1652-1687

Ted Greer McCormick

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ABSTRACT

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Ted Greer McCormick

This dissertation reexamines the origins of "political arithmetic", an early strand of political economy, in the intellectual and political context of late Stuart Britain and Ireland. It is based on a close study of the printed work and more especially of the manuscripts of Sir William Petty (1623-1687), the inventor of political arithmetic, and on a reconstruction of his strategy of manuscript circulation.

By looking at Petty's work in light of his personal history and the broader politics of the period, the dissertation suggests that political arithmetic should be understood as a contribution to the English colonial project in Ireland. Although it came, from the 1690s onward, to signify a quantitative mode of analysis peculiarly applicable to economic questions, political arithmetic began as a specific and positive political program. In Petty's words, it was part of "the Political Medicine" of Ireland; one of its guiding aims, between 1670 and 1687, was what he called "the transmutation of the Irish into English."

Petty's problematic challenged contemporary writing on national wealth, but had its origins in late Tudor and early Stuart writing on Irish plantation; Petty's personal interest arose from his involvement in Ireland, as the director of a major survey following Cromwell's reconquest of the country in the 1650s, and as a

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landowner thereafter. The alchemical idiom Petty used to describe his program, meanwhile, was essential to his conception of it, and owed much to his background in medicine and experimental philosophy. Intellectually and politically, Petty's political arithmetic was a distinctly late-seventeenth-century phenomenon, addressed to contemporary but longstanding political problems – first in Ireland, and later across the Atlantic and the Irish Sea.

Lastly, the study follows the reception of Petty's work in the new political context of the 1690s. Writers like Gregory King and Charles Davenant embraced Petty's method while dissociating their use of it from his overtly political practice. In so doing they laid the groundwork for the modern disciplinary history of economics as a putatively neutral, scientific enterprise.

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Style and Conventions

Quotations

In quotations from primary sources, I have usually kept the original spelling. Interpolated letters or words are bracketed, with some exceptions: I have silently expanded many of the common abbreviations and ligatures used in seventeenth-century English (thus "y^{e}" is rendered "the", "100M" is "100,000") and modernized some symbols likely to cause confusion ("3*l*" is "£3", and so forth). Since many of the sources in question are manuscripts, and Sir William Petty's handwriting was bad even by the standards of his age and profession (his best friend described it as "hieroglyphics"), the exact transcription of certain spellings is open to question. Where an entire word is in doubt I have put my guess in brackets with a query. All emphases – italics or underlining – are in the original sources. When quoting from a modern edition of an early-modern source, I have followed the modern editor's conventions in spelling and other matters.

Dates

During the period covered in this study England officially marked the new year not on January 1 but on March 25; in addition, the English calendar (Julian) was

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ten days behind the continental European (Gregorian). In many of the sources, especially correspondence, dates are given and quoted in the Old Style, though Petty and many others wrote double years between January 1 and March 25: thus our "March 24, 1660" was his "March 14 [or 14/24, in correspondence with the Continent] 1659/60." But in the body of the text, and elsewhere when serious confusion is likely, I have used the New Style; the Old Style will usually be apparent from the double dates.

Abbreviations

The following abbreviations are used in the footnotes throughout (each source is introduced in full at the first citation, and cited in full in the bibliography):

BL	British Library (London)
BL MS Add.	Additional Manuscripts collection, British Library
Bodl.	Bodleian Library (Oxford)
Correspondence	William Petty and Robert Southwell (ed. Marquis of Lansdowne), *The Petty-Southwell Correspondence, 1676-1687* (London, 1928)
EW	William Petty (ed. C.H. Hull), *The Economic Writings of Sir William Petty*, 2 vols. (Cambridge, 1899)
NA	National Archives (Kew)

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Oxford DNB	H.C.G. Matthew and Brian Harrison (eds.), *Oxford Dictionary of National Biography: in association with the British Academy: from the earliest times to the year 2000*, 60 vols. (Oxford, 2004) (Print and online editions)
DNB	Leslie Stephen and Sidney Lee (eds.), *Dictionary of National Biography*, 66 vols. (London, 1885-1901)
Petty Papers	William Petty (ed. Marquis of Lansdowne), *The Petty Papers: Some Unpublished Writings of Sir William Petty*, 2 vols. (London, 1927)
RS	Royal Society Library
TCD	Trinity College Dublin Library

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Acknowledgements

My advisor, Professor David Armitage of Harvard University, was the first to suggest that I look at William Petty, and has been an exceptionally helpful and encouraging critic of my progress and results in the years since. Without implicating him unduly in the form this dissertation has finally taken, I can safely say that without him it would simply not exist. My first thanks are to him.

I conducted most of the archival research for the dissertation in Britain and Ireland during the 2003-2004 academic session, while holding an Institute of Historical Research/Andrew W. Mellon Dissertation Fellowship. The material support the fellowship provided was immediately vital to the project. No less so in the long run was the institutional support provided by the IHR, and I owe thanks to the Director of the IHR, Dr. David Bates, and to my surrogate advisor there, Julian Hoppit, Head of History at University College London. A 2004 Summer Fellowship from the Department of History at Columbia University facilitated a research trip to Montreal, while the chance to participate in a Mellon Foundation Summer Seminar at the California Institute of Technology on "Intellectual History and other Forms of History" enabled further research at the Huntington Library; my thanks especially to Professor Mordechai Feingold of Caltech.

Although I spent most of my time on one set of papers in one archive, many were ultimately involved. I owe a large debt of gratitude to the staff of Manuscripts Reading Room at the British Library, and in particular to Dr. Frances Harris, Curator in the Department of Manuscripts, who catalogued the Petty Papers and helped guide

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me through them in the first days of my research. Thanks also to the staffs of Duke Humphrey's Library at the Bodleian Library in Oxford, the Institute of Historical Research at the University of London, the National Archives in Kew, and the Huntington Library in Pasadena. Archivists and librarians at the Royal Society Library in London, the manuscripts reading room at Trinity College Library in Dublin and the rare books reading room at the Osler Library of the History of Medicine at McGill University in Montreal all went well beyond the call of duty in helping me to sort out obscure references and find rarely-used manuscripts.

I wrote parts of the dissertation in London, New York, and Pasadena, with help from the fellowships already mentioned. A Visiting Fellowship at Harvard University for 2004-2005 enabled me to devote myself to writing the rest and revising the whole. Professor Julian Hoppit of UCL and Dr. Toby Barnard of the University of Oxford have each suggested new directions for my research, alerted me to valuable and often obscure secondary work, and offered advice on one or more of my chapters. Their generosity is very greatly appreciated. From my dissertation committee, Professor Carl Wennerlind of Barnard College, Professor Matthew Jones and Professor Martha Howell of Columbia University helped shape the initial idea and have provided helpful feedback on various chapter drafts since then. Karl Bottigheimer, Professor Emeritus at SUNY-Stony Brook, kindly served as an outside examiner for the dissertation defense and provided some very helpful comments. Conversations with a variety of other people helped me fill in some of the blanks and avoid potentially embarassing mistakes. Among these, Dr. Negley Harte of UCL, and

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Emma Rothschild of the University of Cambridge stand out. Despite the best efforts of all concerned, I have undoubtedly left plenty of errors for others to find.

I have tested different parts of my argument on several wider audiences, with unpredictable but invariably useful results. Professor Mordechai Feingold and the members of the 2004 Mellon Summer Seminar at Caltech offered diverse and penetrating criticisms of what is now, in modified form, Chapter 2. I presented elements of this and the beginnings of Chapter 3 at the "Restoration Ireland" conference hosted by Trinity College and University College Dublin in September 2004; thanks to the organizers, John Gibney of TCD and Coleman Dennehy of UCD, for their hospitality and conversation. The Early Modern Europe Group at Columbia University read Chapter 6, and parts of Chapters 2 and 6 went into a paper for the Early Modern History Workshop at Harvard University. For the first opportunity, my thanks to Professor Martha Howell of Columbia and Professor Carl Wennerlind of Barnard; for the second, to Adam Beaver and John Gagne of Harvard's Department of History. The core of what is now Chapter 3 took its final shape at a meeting of the Early Science Working Group at Harvard. Thanks to Beth Yale, of Harvard's Department of the History of Science, for organizing the event, and to the audience, which helped me see what I was trying to say more clearly than I could have done on my own.

Theresa Ventura has acted throughout the dissertation process as a perceptive reader, watchful editor, and constructive critic, no less than as my best and closest friend. No category sums all that up, so I will say thanks here, with the hope that I can

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some day return the favor. I am also grateful to her family for their hospitality during my visits to New York, and for putting up with Theresa's extended absence from it.

Thanks, finally, to my family, who have supported me materially, emotionally and intellectually from the beginning.

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To my parents

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1: Introduction

This dissertation asks what an idea called "political arithmetic" meant to the man who first expressed it, an English man named William Petty, who lived from 1623 to 1687. But this is not as simple as it sounds. Unfamiliar though political arithmetic is to most people (and perhaps even to most historians of early modern Britain), in various different manifestations it marked a turning point in the history of economics, of social science, and of the modern state itself. Defined by one of Petty's self-proclaimed heirs as "the Method of Reasoning by Figures, upon Things relating to Government",[1] for much of the eighteenth century political arithmetic was synonymous with quantitative reasoning itself; even Adam Smith himself, who "had no great faith" in it, felt the need to say so.[2] As its inventor, Petty was eulogized and criticized, and sometimes both at once: Karl Marx put him on the map for modern readers by dubbing him the "founder" of the classical political economy Marx himself set out to demolish.[3] No topic handled in so decisive a manner by the likes of Smith and Marx should be taken up lightly.

In a way, this is exactly the point of the present study. Smith and Marx so dominate the historical imagination, one as the first modern economist and the other as the first and perhaps deepest critic of modern economics, that even among specialists in the history of economics – and much more so among the wider reading

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[1] Charles Davenant, *Discourses on the Publick Revenues, and on the Trade of England* (London, 1698), 2.

[2] Adam Smith (ed. Edwin R. Cannan), *An Inquiry into the Nature and Causes of the Wealth of Nations* ([1776]; Chicago, 1976), 2:42.

[3] Karl Marx, *Theories of Surplus Value*, vol.1., ([1861]; rpr. London, 1967), 1.

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public – political arithmetic is known best by what they said about it. The question of what it meant to Petty has never come up. Yet when Petty wrote neither the great economists who interpreted his work nor economics itself were dreamed of; if there is one sure thing, it seems, it is that political arithmetic did *not* mean to Petty what it meant to Smith or Marx or what it does to us. The present work looks at Petty's idea as he developed it, in terms of the political, cultural and intellectual contexts in which he wrote it, and with reference to the ends he meant it to serve. An exercise in recovery for its own sake may seem indulgent, but in this case the recovery alone has been worthwhile. If Petty's political arithmetic turns out to be something other than the vague proto-economics many have imagined, that is because it was something, historically speaking, far more interesting: a political program for Ireland, an art of government tailored to the complex problems of the late Stuart world. Seeing Petty and his work in terms of the circumstances in which he produced it can help us make better sense of both.

But recovery is only part of the point. The present work assumes that what Petty wrote was shaped by his intellectual and political surroundings and history, and that it was written for purposes whose meaning is inseparable from that context; it tries to put some of the different sides of Petty back together, and in so doing to make Petty himself speak more clearly (and say something more interesting) to the various audiences – historians of Britain and Ireland, historians of the natural and social sciences, and intellectual and cultural historians – who have seen only bits and pieces of him in the past. It is not a biography, however, and its subject is not Petty but political arithmetic. Reviewing the development of political arithmetic in the

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seventeenth century is important in part precisely because of the influence this idea is supposed to have had later on. The point is not to erase or cross out the judgments of Smith, Marx, and their heirs, but to get behind them for a moment and to see what they obscure, what they retain, and what they highlight. Political arithmetic was not the neutral proto-science it has been seen to be; neither, perhaps, is modern economics. If this "hidden" history of political arithmetic can tell us a lot about the seventeenth century, it speaks equally well to the subsequent pattern of its interpretation and reinterpretation, a measure of our distance and direction from it.

A brief life[4]

William Petty's life was an astounding success by most measures, and particularly by those of the seventeenth century. He was born in Romsey, a small town in Hampshire, in the midst of the trade depression of the 1620s. "His father was a by profession a clothier, and also did dye his owne clothes: he left little or no estate to Sir William."[5] Left to his own devices, Sir William did well for himself. He died in 1687 a knight, lord of a vast and profitable estate in the west of Ireland and five

[4] Since it has been customary in almost everything written about Petty to retell his life story, this may seem unnecessary. But since very little written about Petty is addressed to anyone besides historians of economics, science, or Ireland, and as the present work aims at a more coherent synthesis and a wider audience, a biographical sketch seems desirable. The only full-length biography of Petty based on Petty is Edmond Fitzmaurice, *The Life of Sir William Petty, 1623-1687* (London, 1895). It contains virtually all that is known about Petty's life, but after 110 years looks somewhat out-of-date in its approach; it also suffers slightly from the fact that Fitzmaurice was a descendant of Petty's, though this also meant that he had Petty's manuscripts at his disposal. Emil Strauss, *Sir William Petty: Portrait of a Genius* (London, 1954) relies entirely on printed material and indeed largely on Fitzmaurice. P.G. Dale's *Sir W.P. of Romsey* (Romsey, Hampshire, 1987) is, at roughly 100 pages, really a long biographical essay, and does not make much use of Petty's manuscripts; but it is the only work that makes much effort to see Petty in relation to his home town, and provides some valuable context. Toby Barnard's entry ("Petty, Sir William (1623-1687") in the *Oxford Dictionary of National Biography: in association with the British Academy: from the earliest times to the year 2000*, 60 vols. (Oxford, 2004) [hereafter *Oxford DNB*], 43:948-951 is the most up-to-date brief introduction.

[5] John Aubrey (ed. O.L. Dick), *Aubrey's Brief Lives* (London, 1939), 237.

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thousand acres of land in the new colony of Pennsylvania, father of a family whose descendants are still the Marquises of Lansdowne. He was quite proud of what we would call his upward mobility, though he evidently thought it no more than the fruits of his own hard work. His will, drawn up in 1685, sounds in places like a self-help manifesto, distinguishing between the deserving and undeserving in sometimes startling terms.

> As for legacys to the poor I am at a stand, as for beggars by trade & election I give them nothing, as for impotents by the hand of God the publique ought to maintain them as for those who have bin bred to no calling nor estate they should be put upon their kin[d]red As for those who can get no worke the magistrate should cause them to be imployed (which may be wel done in Ireland where is 15 acres of improvable land for every head). ... I am content that I have assisted all my poor relations & put many into a way of getting their own bread & have laboured on publique works & inventions, have sought out real objects of Charity, & doe hereby conjure all who partake of my estate to doe the like at their peril, neverthelesse to answer custome & to take the surer side I give £20 to the most wanting of the parish wherin I die.[6]

From a man who boasted of an annual income of more than £6500, this was not exactly largesse.[7] This awkward combination of private interest and public service ("doing good while doing well," as one modern scholar put it),[8] defensiveness and last-minute switches to "the surer side" strikes the modern reader as one of Petty's

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[6] BL MS Sloane 2903, f.17. The will is printed in Fitzmaurice, *The Life of Sir William Petty*, 318-324.

[7] See Fitzmaurice, *The Life of Sir William Petty*, 321.

[8] Dr. Lindsay Sharp, author of "Sir William Petty and Some Aspects of Seventeenth-Century Natural Philosophy" (unpublished D.Phil. thesis, Oxford, 1976), in private conversation, 9 June 2004. Sharp's thesis, which made use of the Petty Papers while they were still held by the Lansdowne estate at Bowood (see below), and Fitzmaurice's biography are the two most important secondary sources on Petty.

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less evidently appealing characteristics, and many of his contemporaries felt the same way.

But it also underlines just how unusual, and perhaps precarious, his success seemed even to Petty himself. To the end of his life Petty remembered (or at least thought he remembered) the minutest details of his first money-making schemes. In 1686, at the age of sixty-three, he promised to explain to his close friend Robert Southwell "How I gott the shilling I mentioned to have had at Xmas, 1636[.]" The sheer fact that he remembered a shilling at a distance of fifty years is as revealing as his description of how he got it, "which was by 6d I got of a country Squire for showing him a pretty trick on the cards, which begot the other 6d fairly won at cards."[9] Soon, he recalled, he graduated to larger and more profitable scams. After explaining to Southwell "How this shilling came to be 4s 6d" (through reading religious tracts to an elderly woman, and construing Ovid's *Metamorphoses* for an unlettered Romsey man), Petty described how during his apprenticeship on a merchant ship

> This 4s 6d was layd out in France upon pitiful brass things with cool'd glass in them, instead of diamonds and rubies. These I sold at home to the young fellows, whom I understood to have sweethearts, for treble what they cost.[10]

Still later "(my Ring trade being understood and lost) I set up... upon the trade of playing cards, white starch, and hayre hatts, which I exchanged for tobacco pipes and

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[9] Petty to Southwell, 14 July 1686, in Landowne (ed.), *The Petty-Southwell Correspondence, 1676-1687* (London, 1928) [hereafter simply *Correspondence*], 216.

[10] Petty to Southwell, 14 July 1686, in *Correspondence*, 216.

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the shreds of Letter and parchment, wherewith to size paper."[11] Petty learned at an early age to live by his wits, whether that meant reading Ovid or performing card tricks. He never forgot the lesson.

Material self-improvement is only half of Petty's story, however, and may be the less impressive half. Born to an artisan, Petty must have been expected to become an artisan or perhaps a merchant himself; late in life he recalled watching different tradesmen as a child, and at fifteen, as we have heard, he "began to play the merchant" on a ship trading between southeast England and Normandy.[12] But before long, his shipmates, irritated, he thought, by his learning (and perhaps also by his self-promotion), abandoned him in the Normandy town of Caen with no way home and a mysteriously broken leg. In Caen, his learning quickly distinguished him as "le Petit Matelot Anglois qui parle Latin et Grec", and while his leg healed he set his sights on the Jesuit *collège* nearby. "I made verses to the Jesuits, expressing my desires of returning to the muses", and these, together with the proceeds of his cards-and-tobacco-pipe trade, earned him a place at the school.[13] Here he deepened his study of languages (he ultimately learned Latin, Greek, French, and German – not unheard-of, certainly, but not bad for the son of a Hampshire cloth-worker) and began to work on mathematics, for which he apparently had considerable aptitude.[14] This may also have

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[11] Petty to Southwell, 14 July 1686, in *Correspondence*, 217.

[12] Aubrey, *Brief Lives*, 237.

[13] Petty to Southwell, 14 July 1686, in *Correspondence*, 216-217.

[14] Fitzmaurice, *The Life of Sir William Petty*, 1-5.

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been his first brush with the atomism central to the mechanistic "New Philosophy" of the seventeenth century.[15]

When the Civil War broke out in England Petty returned to the Continent and further study. He spent the mid-1640s studying medicine at the Universities of Amsterdam, Utrecht, and Leiden. Leiden, which pioneered the academic incorporation of both clinical and chemical medicine in this period, seems to have made particular mark on him.[16] From there he moved on to Paris, where, with a letter of introduction from the mathematician John Pell (whom Petty had met in Amsterdam), Petty first became acquainted with Thomas Hobbes. Hobbes's views not only of politics but also of nature, and human nature, would visibly shape Petty's own.[17] With Hobbes he read Vesalius on anatomy and worked on optics,[18] and

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[15] According to Mordechai Feingold, "Jesuits: Savants", in Feingold (ed.), *Jesuit Science and the Republic of Letters* (Cambridge, MA, 2003), 1-45, 27: "beginning at the turn of the seventeenth century, not a few Jesuits incorporated [atomism] into their lectures." Though this was actively discouraged from 1632 on, "the routine reissuing of... injunctions" against it "attest[s] to the continued dissemination of atomism within the Order" (29).

[16] On Leiden's influence on English medicine, see Andrew Wear, *Knowledge and Practice in English Medicine, 1550-1680* (Cambridge, 2000), 445; A.W. Sloan, *English Medicine in the Seventeenth Century* (Durham, 1996), 81-82. The physician and author Sir Thomas Browne preceded Petty at the University of Leiden by slightly more than a decade; both men crossed paths with, and may have studied under, Jan de Wale (Johannes Walaeus), a professor of medicine there. For Browne's time at Leiden see Jeremiah S. Finch, *Sir Thomas Browne: A Doctor's Life in Science and Faith* (New York, 1961), 65-75.

[17] See Quentin Skinner, "Thomas Hobbes and His Disciples in England and France", *Comparative Studies of Society and History* 8:2 (1966), 153-167, reprinted with revisions in Skinner, *Visions of Politics*, vol. III: *Hobbes and Civil Science* (Cambridge, 2002), 308-323; Skinner, "Thomas Hobbes and the Nature of the Early Royal Society", *Historical Journal* 12 (1969), 217-239, extended and revised in Skinner, *Visions of Politics*, III, 324-345.

[18] A letter from Charles Cavendish to John Pell, 1/11 November 1645, reported that "Mr. Hobbes intends to publish as soon as he can a treatise of opticks; he hath done half of it, & Mr. Petit [i.e. Petty] hath writ it faire" (in Noel Malcolm and Jacqueline Stedall (eds.), *John Pell (1611-1685) and his correspondence with Sir Charles Cavendish: The mental world of an early modern mathematician* (Oxford, 2005), 434); see also Aubrey, *Brief Lives*, 237. In a subsequent letter Pell described Petty to Cavendish "as a hopefull young man, who by countenance & counsel may become exceeding usefull"; Pell to Cavendish, 15/25 November 1645, in Malcolm and Stedall (eds.), *John Pell (1611-1685) and his correspondence*, 441.

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through Hobbes he met major French intellectual figures like Pierre Gassendi and Marin Mersenne, as well as exiled English royalists of a scientific bent, like the Cavendish brothers (though there is little evidence of subsequent contact, Petty would dedicate his 1674 *Discourse... Concerning the Use of Duplicate Proportion* to William Cavendish, Duke of Newcastle, in memory of those Paris days).[19] Crucially, with respect to the long-term development of political arithmetic, Hobbes seems to have taught Petty to see politics through the lens of mathematical and mechanical philosophy.[20] More immediately, Petty's stopover in Paris ensured that when he returned once more to England in 1646, at the age of 23, he was already known to and indeed well regarded by some of the greatest names of seventeenth-century scientific and political thought.[21]

Much more was to come. In London he joined the circle of experimental philosophers known as the "1645 group", which put him in contact with the German émigré "intelligencer" Samuel Hartlib, a sort of one-man clearing-house of scientific and social reform schemes.[22] Hartlib, in turn, introduced Petty to Robert Boyle. His new connections brought him new opportunities: after finishing his doctorate in medicine at Oxford in 1649, Petty soon became Fellow of Brasenose College and Deputy to the University Professor of Anatomy, and by 1651 was Vice-Principal of

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[19] Petty, *The Discourse Made before the Royal Society the 26th of November 1674, Concerning the Use of Duplicate Proportion in Sundry Important Particulars: Together with a New Hypothesis of Springing or Elastique Motions* (London, 1674).

[20] See Chapter 3.

[21] Fitzmaurice, *The Life of Sir William Petty*, 5-10.

[22] See Charles Webster, *The Great Instauration: Science, Medicine and Reform 1626-1660* (London, 1975) for the activities of the Hartlib Circle and Petty's involvement in it.

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Brasenose and Professor of Anatomy in his own right.[23] His lectures, a few of which survive in the British Library, testify to his Harveian training in Leiden as well as to a certain fairly common eclecticism in combining traditional herbal with newer chemical remedies.[24] Petty's rapid advancement came in special circumstances – the Cromwellian purge of Oxford faculty – that indicate his political adaptability. But his 1651 appointments also followed closely on his involvement in a local *cause célèbre*, the resuscitation of Ann Greene. Hanged for killing her illegitimate child, Greene was bound for the dissecting room when Petty and his Oxford colleague John Wilkins saw signs of life. They revived her, and their work was quickly sensationalized in pamphlets entitled *A Wonder of wonders* and *Newes from the Dead*.[25] In the same year he also became Professor of Music at Gresham College in London shortly thereafter, an appointment obtained through the offices of one Major John Graunt, later author of the *Natural and Political Observations... upon the Bills of Mortality*.[26]

At this point, Petty had published one small tract for Hartlib on educational and medical reform, strongly influenced, like many other Hartlibian schemes, by

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[23] Fitzmaurice, *The Life of Sir William Petty*, 16-21.

[24] Drafts of some of Petty's lectures and related notes are in BL MS Add. 72891. On Petty's lectures see Sharp, "Sir William Petty and Some Aspects of Seventeenth-Century Natural Philosophy", 100ff, and Robert G. Frank, Jr., *Harvey and the Oxford Physiologists: A Study of Scientific Ideas* (Berkeley, 1980), 100-103. A much later anatomy lecture (delivered at Trinity College Dublin in 1676) is printed in Petty (ed. Marquis of Lansdowne), *The Petty Papers: Some Unpublished Writings of Sir William Petty* (London, 1927), 1:171-179.

[25] W.Burdet, *A Wonder of wonders* (Oxford, 1651); [Richard Watkins], *Newes from the Dead: or a True and Exact Narration of the Miraculous Deliverance of Anne Greene* (Oxford, 1651). Laura Gowing wrote the entry for "Greene, Anne (c.1632-1659)" in the *Oxford DNB* [accessed online; see bibliography]. See Fitzmaurice, *The Life of Sir William Petty*, 18-19.

[26] On Petty's appointment see Fitzmaurice, *The Life of Sir William* Petty, 20. John Graunt, *Natural and Political Observations Mentioned in a following Index, and made upon the Bills of Mortality* (London, 1662).

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Francis Bacon, calling for a shift away from the classical curriculum towards practical skills, mathematics, and experiment.[27] He had also invented, or at least advertised, a mysterious "machine for double-writing" whose existence was a matter of some doubt even at the time.[28] He had twenty-seven years to live and several better-known publications and inventions ahead of him. But already the trajectory is clear enough. At the end of his life, Petty's friends – a group that included such men as Sir Robert Southwell (a diplomat and future President of the Royal Society), Samuel Pepys (known today as a diarist, but then as the genius of the Admiralty), and Sir Peter Pett (scion of a major shipbuilding family) – were sure that his greatest legacy was, to use our word, scientific.

Petty's chief claim to fame by the Restoration of 1660, however, was neither as a physician nor as a natural philosopher but as a surveyor, more specifically as the architect of the "Down Survey", undertaken in Ireland in 1654-6. Understanding the significance of the survey is absolutely essential to understanding not only Petty's personal history (it was the foundation of his fortune) but also the aspect of his work that is the subject of this dissertation; it requires a brief excursion into a very complicated chapter of Irish history.[29]

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[27] W[illiam] P[etty], *The Advice of W.P. to Mr. Samuel Hartlib Concerning the Advancement of Some Particular Parts of Learning* (London, 1647). The title refers to Bacon's *De Augmentis Scientiarum* (*The Advancement of Learning*) and some of the ideas recall Bacon's *The New Atlantis*. See Fitmaurice, *The Life of Sir William Petty*, 10-13.

[28] A notice of this invention was inserted into *The Advice of W.P. to Mr. Samuel Hartlib* (London, 1647); a longer description was printed the following year: Petty, *A Declaration Concerning the newly invented Art of Double Writing* (London, 1648). Petty dedicated his invention to his new acquaintance, Robert Boyle. See Fitzmaurice, *The Life of Sir William Petty*, 10-11.

[29] See Fitzmaurice, *The Life of Sir William Petty*, 23-90 for an account of the background to the Survey, Petty's involvement, and the disputes that ensued.

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Petty and his contemporaries saw English involvement in Ireland as a single process of "plantation" – cultivation of the waste land as well as civilization of the wild people – that had begun in the 1170s with Henry II's invasion and continued, through five centuries of rebellion, war and massacre, to their own day.[30] And from the beginning, it had been plagued by insufficient manpower, money, and Crown oversight. Instead of a single state enterprise, Irish plantation was a matter of bickering and petty war between private planters, whose internecine rivalries constantly tempted them into formal political – and, concomitantly but more perilously, social – alliances with their Irish neighbors. Within a few generations, even a few decades, English planters, through contact and intermarriage with the "mere Irish", might "degenerate" into Irish themselves. The original Anglo-Norman planters and their descendants, the "Old English" or "English-Irish", were generally seen by the English as degenerate in this sense, and this view was sharpened by the Reformation, since both Old English and Gaelic Irish were Roman Catholic, while the "New English" and Scottish Presbyterian planters, from the Elizabethan era onward, were often militantly Protestant. At the end of the sixteenth century three elites competed for supremacy: Old Irish lords, regarded by the English as barbarians and heathens; Old English Catholics, despised by Protestants as degenerate papists; and a rising class of New English Protestant planters (Robert Boyle's father, the "Great Earl" of Cork, among them).

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[30] The most comprehensive account of English projects for Irish plantation in the late Tudor and early Stuart period is Nicholas Canny, *Making Ireland British, 1580-1650* (Oxford, 2001). David Beers Quinn's older study, *The Elizabethans and the Irish* (Ithaca, 1966), though somewhat dated, is still well worth reading for English perceptions of the Irish and the purposes and problems of colonial plantation.

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Defeat in the Nine Years' War early in the seventeenth century, and still more the "Flight of the Northern Earls" from further persecution in 1607, seemed to clear the Gaelic Irish from the field. But this only increased tensions between the remaining contenders. Protestant suspicions of Old English loyalty led to ever-greater restrictions on the power of the traditional ruling class, and in time fulfilled themselves.[31] In October 1641 a violent Irish rebellion in Ulster quickly spread southward; the Protestant response was ferocious and fatally indiscriminate. Large segments of the Old English, forced into a corner, opted to join their co-religionists rather than their hostile nominal countrymen.[32] With England's energies diverted by the outbreak of fighting between Parliamentary and royal armies, Catholic forces soon took control of most of Ireland. A Catholic Confederacy formed at Kilkenny, swearing its loyalty to Charles I while protesting its need to protect itself from his rebellious Protestant subjects. This Confederacy governed Ireland for the rest of the decade, defeated only by the invasion of Oliver Cromwell.[33]

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[31] The classic study of this process is Aidan Clarke, *The Old English in Ireland, 1625-42* (Dublin, 1966). For the Earl of Strafford's catalytic role in the final breach, see Hugh F. Kearney, *Strafford in Ireland, 1633-41: A Study in Absolutism* (Manchester, 1959).

[32] See Clarke, *The Old English in Ireland*, and "The 1641 Rebellion and Anti-Popery in Ireland", in Brian Mac Cuarta (ed.), *1641: Aspects of the Rising* (Belfast, 1993), 139-157. On 1641 in general see the other essays in the same volume; Jane Ohlmeyer, "Introduction: A Failed Revolution?", and Canny, "What Really Happened in 1641?", both in Ohlmeyer (ed.), *Ireland from Independence to Occupation, 1641-1660* (Cambridge, 1995), 1-23 and 24-42; Canny, "Religion, Politics and the Irish Rising of 1641", in Judith Devlin and Ronan Fanning (eds.), *Religion and Rebellion* (Dublin, 1995), 40-70.

[33] On Confederate rule, see Michael Ó Siochru, *Confederate Ireland, 1642-1649: A Constitutional and Political Analysis* (Dublin, 1999). On Cromwell's invasion, see James Scott Wheeler, *Cromwell in Ireland* (Dublin, 1999).

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As early as 1642 the English Parliament passed a measure meant to finance the recovery of Ireland.[34] Fittingly named the "Adventurers' Act", it stipulated that London financiers who subscribed funds for equipping an army would be repaid in debentures for Irish land, a great deal of which would presumably be confiscated from the Irish rebels and their Old English accomplices. In the event, however, Parliament used most of the adventurers' money not to fight the Irish in Ireland but to fight the King in England. By the time England was tolerably secure and an Irish invasion once more in the offing, years later, a new way had to be found to pay an already underpaid and increasingly restless army. Once again, the government resorted to promises of Irish land, this time for the conquering soldiers themselves. Thus one of the first and most urgent tasks of the English administration in Ireland once the country was finally reconquered and relatively peaceful, in 1652, was to confiscate, survey, and redistribute all the rebel land on which so much had come to depend. It was at around this time that William Petty, only lately Professor of Anatomy at Cromwellian Oxford and still remembered as one of the saviors of Ann Greene, arrived in Ireland to take up his new appointment as physician-general to the English army.

How this move came about is unclear, though Petty's personal ambitions were evidently too large for his place at Oxford and perhaps for the practice of medicine itself to satisfy.[35] In Ireland he became Henry Cromwell's secretary as well as his

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[34] See Karl S. Bottigheimer, *English Money and Irish Land: The 'Adventurers' in the Cromwellian Settlement of Ireland* (Oxford, 1971).

[35] Sharp, "Sir William Petty and Some Aspects of Seventeenth-Century Natural Philosophy", writes (107) that "[I]n 1651 [Petty] believed that Ireland offered him a chance to combine technical skills, scientific interests, and opinions about government and society in a way which greatly benefited his own career."

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physician, and soon much more. It may be, as he later claimed, because he hoped to "enlarge my Trade of Experiments from Bodies to Mindes... thereby to have understood passions as well as fermentations,"[36] that Petty now took an interest in surveying. But the fact that the Surveyor-General, Benjamin Worsley, was an old rival of Petty's from the Hartlib circle, must have helped, as must the fact that Worsley's protector, General Charles Fleetwood, was a political rival of Henry Cromwell. Seizing a chance to do his patron a favor and advance himself into the bargain, Petty put forward his own proposal for a survey of the forfeited estates. After over a year of political wrangling with Worsley and his protectors – the survey debate was part of a much larger dispute between Cromwell's administration and more radical elements of the army, represented by Worsley's superior, Charles Fleetwood – Petty got the contract.[37]

His plan was audacious. Instead of several years, Petty asked for thirteen months. Instead of using trained surveyors, who were relatively few and expensive, he proposed to train Cromwell's soldiers to do it themselves, covering the necessary mathematics in a crash course at Trinity College and sending them out to conduct the survey in teams using simple printed instructions he wrote. Instead of importing survey equipment ready-made, Petty designed standardized parts that could be purchased more cheaply and assembled by the soldiers on site. Best of all, he would take his own payment at a fixed rate per acre of land surveyed, or, as ultimately happened, in a share of the land itself. (Naturally, this raised questions later on.) And,

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[36] Petty, *Reflections on some Persons and Things in Ireland* (London, 1660), 15.

[37] Fitzmaurice, *The Life of Sir William Petty*, 38-43.

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in fact, the whole thing came off roughly as Petty promised. The soldiers had no easy time of it, the difficult terrain made more dangerous by local resistance. More important in the long run, the survey overestimated the amount of land by about ten percent. (A convenient mistake, given the nature of the contract, but not an unusual marginal of error for such surveys.) The survey, which covered over 3.5 million acres, was completed in a little over thirteen months, though delayed by legal and political battles. Worsley's friends attacked both the survey and Petty's role in it in the Parliament of 1659; but in the end, with much bigger political problems brewing, nothing came of this.[38]

As was often the case, Petty impressed no one more than himself, and up to his death he boasted of the number of circumnavigations of the Earth that the distance surveyed was equivalent to (that number growing as he aged).[39] But what matters here is that his achievement did a great deal to establish his reputation as an expert on Ireland, as well as his position as a landowner. He had a personal and a professional stake in the Acts of Settlement: he owned the survey maps, he dealt with the first claims, he defended the terms of the settlement and the survey against all comers. And for the rest of his life he sought influence over Irish policy and the makers of it, staking his claims of expertise on Irish matters on the reputation he had earned in the

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[38] As part of his defense Petty compiled his own documentary history of the survey, later printed as Petty, *The History of the Survey of Ireland Commonly called the Down Survey, A.D. 1655-1656* (London, 1851; rpr. New York, 1967). Details of Parliamentary proceedings against him brought by Colonel Hierome Sankey were printed in *A Brief of Proceedings between Sir Hierom Sankey and Dr. William Petty* (London, 1659), and Petty gave a much longer account of his own involvement in *Reflections upon some Persons and Things.* See Fitzmaurice, *The Life of Sir William Petty*, 325-329.

[39] See, e.g., Petty to Southwell, 31 July 1686: "I... [measured] the whole world with the Chain and Instrument for neer 6 times about" (*Correspondence*, 223). Compare Petty to Southwell, 13 October 1687: "[I] measured the equivalent to eight times about the world for 9 thousand pound" (*Correspondence*, 294).

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1650s. Despite the decades of lawsuits his new wealth also involved him in – sometimes to the detriment of his work – it was undoubtedly the basis for both the freedom he had to develop his ideas and the political hopes he impatiently cherished. What historians have never fully appreciated is what these hopes entailed in terms of policy, and how serious they were.

The Down Survey also laid a major foundation for the decisive transformation of Irish political geography. Even before the rebellion, Irish Catholic landownership had been declining, but in 1641 it remained at around fifty percent. The cumulative effects of the Cromwellian settlement, the Restoration settlement (which confirmed it, with slight modifications) and the Williamite settlement of the 1690s (which reversed James II's attempts to modify and then revoke it, and brought in new confiscations) reduced that share to under a fifth.[40] The exact dimensions of the shift, and its permanence, were far from clear at the time; Irish lobbyists against the survey surfaced at court again and again through the 1660s and 1670s, and under James II the settlement was finally put on the block, only to be saved by William of Orange's armies. In the short term, the survival or revocation of the settlement was the great question of Irish politics. In the longer term, its survival and consolidation paved the way for over a century of English supremacy over Ireland and "Protestant

[40] Though the precise significance of this is a matter of debate. For example, much of the land confiscated from Catholics was resold in more or less roundabout ways to other Catholics, or held for them (similarly, after the Irish Parliament introduced measures to break up Catholic estates by enforcing partible inheritance after the Glorious Revolution some Catholic heirs may simply have converted in order to maintain the family estates intact). The letter of the law does not always convey the reality on the ground. Nevertheless there is no question about the overall shape of the change. Several works dealing with the settlement and its impact are cited below. Kevin McKenny points the way to a definitive picture of land transfers in "The Seventeenth-Century Land Settlement in Ireland: Towards a Statistical Interpretation", in Ohlmeyer (ed.), *Ireland from Independence to Occupation*, 181-200.

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Ascendancy" within. Petty's work was at the core of all this, and Ireland was, quite naturally, the focus of much of his thought throughout his later life – including much of what he would come to refer to as his "political arithmetic."

This brings us back to the Restoration and Petty's intellectual career. When Charles II came to the throne, Petty already had a varied reputation – inventor, anatomist, physician, surveyor. After the Restoration, under the auspices of the Royal Society of which he was a founding Fellow, Petty's brand of practically oriented intellectual inquiry bloomed. Knighted by Charles for his work in Ireland, he presented the amused King with a scheme for a double-hulled ship that would require fewer men and carry greater loads faster than conventional shipping.[41] In 1662 he printed *A Treatise of Taxes and Contributions*, which argued for a tax on consumption, investigated the nature of value, and is still considered a minor classic in the early history of economics.[42] That same year he had a hand in the publication, and possibly the composition, of John Graunt's *Natural and Political Observations on the Bills of Mortality*, an early milestone in statistical demography and still an important source of historical population data.[43] In 1665 Petty presented "A History

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[41] The unhappy fate of this project in its various incarnations is detailed in Fitzmaurice, *The Life of William Petty*; many relevant papers are in BL MS Add. 72894.

[42] Petty, *A Treatise of Taxes and Contributions* (London, 1662). The next section but one discusses this historiography, and its impact on understanding Petty, at length.

[43] Graunt, *Natural and Political Observations*. The authorship of the *Bills* has been debated on and off almost since they were written. I have little in the way of evidence to add to either side (what little I do have is mentioned in Chapter 5, and suggests Graunt's authorship), but I "take the surer side" in favor of Graunt: there is no unambiguous evidence to the contrary and this is the majority view among recent scholars – the major dissenting voice being the Marquis of Lansdowne, in a comment in his selection of *The Petty Papers*, 2:273-284, and in his introduction to the *Petty-Southwell Correspondence*, xxiii-xxxii. Otherwise see Charles Henry Hull's introduction to *The Economic Writings of Sir William Petty* (Cambridge, 1899), 1:xxxix-liv; Hull, "Graunt or Petty?", *Political Science Quarterly* 11:1 (1896), 105-132. More recent additions to the debate have added little in the way of evidence. However, Petty clearly advised Graunt and supplied him with some of his sources; he also edited later editions of the

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of Dy[e]ing and Tinctures" to the Royal Society, drawing evidently on the experiences of his youth, as his contribution to the Society's program in the "history of trades", which aimed at gathering craft techniques known only to artisans and combining them with the science of the natural philosophers, to mutual benefit – a combination of sources and aims Petty himself virtually embodied.[44]

In 1667 he married Elizabeth Fenton. Fairly wealthy and very well-connected, Elizabeth was also the daughter of Sir Hardress Waller, one of Petty's political backers in Survey days, but now stigmatized as a regicide. The marriage seems to have been happy, and the letters between the two reveal an enthusiastic husband and father, and a patient and capable wife. Elizabeth was often called upon to manage Petty's Irish estates in his absence, an unpleasant, difficult and sometimes dangerous task.[45] An especially important accident of the marriage, from the point of view of the present work, is that it introduced Petty to Elizabeth's cousin, Sir Robert Southwell. Petty and Southwell would become the closest of friends, and their correspondence, spanning the 1670s and 1680s, is one of the richest sources available for Petty's life and ideas.[46]

In terms of ideas, the 1670s and 1680s brought an embarrassment of riches – machines for purifying seawater; carriages for mountain driving that could not be

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work, adding new material of his own. The nature of scientific authorship in the seventeenth century is a field of study unto itself, and in the context of the present work there is limited purpose in pinning the *Bills* to one man at the expense of the other, since there is evidence of collaboration, shared interests, and shared views.

[44] The manuscript is in BL MS Add. 72897, ff.1-37. The "History" was included in Thomas Sprat, *The History of the Royal-Society of London, for the Improving of Natural Knowledge* (London, 1667), 284-306.

[45] See Fitzmaurice, *The Life of Sir William Petty*, 153-166.

[46] *Correspondence.*

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overturned; further variants of the "Double-Bottom"; even a plan for fortifying Dublin's harbor with "wool walls", the feasibility of which Petty explored with Samuel Pepys one afternoon by shooting bales of wool with pistols and measuring how far the bullets penetrated.[47] The same years brought forth a few more publications – *The Discourse... Concerning the Use of Duplicate Proportion*, again for the Royal Society, which described mathematical relationships obtaining in various aspects of life and trade and included an appendix wherein Petty described his own theory of atoms; several papers on the population of London,[48] and in 1685 an atlas of Ireland based on the survey maps of the 1650s.[49] In 1683 he became President of the new Dublin Philosophical Society, a short-lived younger cousin to the Royal Society of London.

Yet despite these apparent marks of material, personal and intellectual success, Petty's life after the Restoration was in some respects a disappointment to him. Legal problems arising from his estates plagued him, and he was even imprisoned briefly in February 1677 for related run-ins with the English and Irish

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[47] These and other schemes are scattered throughout the lone twentieth-century selection of Petty's unpublished manuscripts. See Lansdowne (ed.), *The Petty Papers: Some Unpublished Writings of Sir William Petty*, 2 vols. (London, 1927) [hereafter simply *Petty Papers*].

[48] Petty, *Another Essay in Political Arithmetick, Concerning the Growth of the City of London: with the Measures, Periods, Causes, and Consequences thereof* (London, 1683); [Petty], *Observations Upon the Dublin-Bills of Mortality, MDCLXXXI. And the State of that City* (London, 1683); Petty, *An Essay Concerning the Multiplication of Mankind* (London, 1686), which included a revised edition of the 1683 *Another Essay*; Petty, *Further Observations upon the Dublin-Bills: Or, Accounts of the Houses, Hearths, Baptisms and Burials in that City* (London, 1686), a revision of the *Observations* of 1683; Petty, *Observations upon the Cities of London and Rome* (London, 1687); *Two Essays in Political Arithmetick, Concerning the People, Housing, Hospitals, &c., of London and Paris* (London, 1687).

[49] Petty, *A Geographicall Description of the Kingdome of Ireland* (London, 1685). A more detailed set of maps appeared the same year as *Hiberniae Delineatio* (London, 1685).

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Lord Chancellors.[50] Try as he might – and he tried constantly – he never really recovered the political clout he had enjoyed in the 1650s, and, the accidents of the Down Survey aside, he seems not to have been cut out for office. The exception that proved this rule was his brief turn as a judge of the Irish Court of Admiralty, beginning in 1676 and formally ending in 1683 (though in reality, Petty had been an absentee for years).[51] The overall picture is of an officious busybody who greatly overestimated the significance of his office, even to the extent of causing serious legal trouble. "The Admiralty of Ireland is a very raw thing," he wrote to Southwell in 1677, "and must bee brought to Maturity by many and mature thoughts", presumably his own.[52] Yet Petty was forced to admit his own lack of experience, and he bewailed the absence of authoritative guidance: "Wee here are the Blind, leading the Blind."[53] His comments on the job quickly degenerated into complaints about the cost of postage it entailed, and he came to feel that, far from being a path to greater influence, the post kept him from doing more important things.[54]

What were these things? Petty's great contribution to posterity, he and his friends agreed, was something called political arithmetic. It was this that led Sir Robert Southwell to take great care of Petty's papers both before and after Petty's

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[50] See Petty to Southwell, 10 February 1676/7, in *Correspondence*, 14-18.

[51] Kevin Costello, "The Judicial Career of Sir William Petty, Judge of the Irish Court of Admiralty, 1676-1683", paper delivered at the British and Irish Legal History Conference, University College Dublin (July 2003).

[52] Petty to Southwell, 18 November 1677, in *Correspondence*, 40.

[53] Petty to Southwell, 10 November 1677, in *Correspondence*, 38.

[54] Petty to Southwell, 19 March 1677/8, in *Correspondence*, 48-52.

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death,[55] and moved another friend, Sir Peter Pett, to pen, perhaps only half in jest, a "Pindarick on Political Arithmetick" that concluded by imagining Petty's epitaph:

> Hic jacet author & magister rerum,
> Hic jacet author politico-arithmeticae,
> quam nemo a Pythagora ad Cartesium descripsit,
> Hic jacet qui fecit quod erat faciendum,
> qui demonstravit, quod erat demonstrandum.[56]

Yet, despite their titles, the works that Petty printed as essays "in Political Arithmetick" were minor, often *ad hoc* polemical affairs,[57] comparing the populations of London, Dublin, Paris, and Rome, using sources like the mortality bills made famous years before by Graunt, and drawing fairly straightforward, usually patriotic, and generally incorrect conclusions about the relative size and prospects of the cities and their nations. Historians of statistics have seen little in Petty's printed political arithmetic that exceeds, and much that fails to equal, the quality of Graunt's earlier and more extended analysis, and even Petty's most immediate successors showed little faith in his numbers.[58] The only major work bearing the title *Political Arithmetick*, on the other hand, was only printed in 1690, three years after Petty's

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[55] See Frances Harris, "Ireland as a Laboratory: the Archive of Sir William Petty", in Michael Hunter (ed.), *Archives of the Scientific Revolution: The Formation and Exchange of Ideas in Seventeenth-Century Europe* (Woodbridge, 1998), 73-90, especially 73f.

[56] BL MS Add, 72899, f.61.

[57] Several of the works cited above were concerned with refuting the criticisms of French writers, and the earliest translation of any of Petty's works into French seems to be a version of the *Two Essays* (London 1687), which had earlier appeared in the *Transactions of the Royal Society*: Petty, *Deux Essays D'Arithmetique Politique, touchant les Villes et Hospitaux de Londres et Paris* (London, 1686).

[58] See for example Karl S. Pearson (ed. E.S. Pearson), *The History of Statistics in the 17th and 18th Centuries: against the changing background of intellectual, scientific, and religious thought: Lectures by Karl Pearson given at University College London during the academic session 1921-1933* (High Wycombe, 1978), 12-22 and 56-59.

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death and after much hesitation on the part of his widow; he can hardly have planned to stake his reputation on this uncertain future.[59] Even allowing for Petty's somewhat exaggerated sense of self-worth, something is missing from this picture. It cannot be found in anything Petty printed, or in any institution he joined. It exists only in manuscript.

Between 1670 or so and his death in December 1687, Petty wrote hundreds of manuscripts, many of which survive.[60] Among these was a much smaller but still significant number of very brief policy proposals that never saw print, and a few, mostly longer works – including *Political Arithmetick* and *The Political Anatomy of Ireland* – that, through various accidents, ultimately did. But although Petty never printed any of these himself (on more than one occasion, he specifically declined to print *Political Arithmetick*,[61] despite the appearance of an unauthorized version of the text in 1683),[62] they are not private papers. They have political subjects and political aims. Throughout the 1670s and 1680s Petty sent them to friends – Southwell, Pett, and Pepys – who passed them on, and upward, to a very select group of influential men, including three Lords Lieutenant of Ireland (the Earl of Essex, the Duke of Ormond and the Earl of Tyrconnell) and Kings Charles II and James II. These manuscripts amounted in Petty's mind to Ireland's "political medicine", the solution

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[59] The circumstances of *Political Arithmetick*'s ultimate publication is discussed in Chapters 2 and 6.

[60] In contrast, few manuscripts of Petty's survive from before 1670. It is more than likely that he destroyed any politically sensitive papers he had at the Restoration, but this does not by itself explain the shape of his archive after 1660; see below.

[61] On this point see Chapter 4.

[62] It appeared as *Englands Guide to Industry, or Improvement of Trade, for the good of all People in general* (London, 1683), attributed to "a Person of Quality", printed in Edward Chamberlayne, *The Fourth Part of The Present State of England* (London, 1683).

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to the problems of the Irish settlement and, ultimately, of English rule in Ireland. For him and for his small but powerful audience, they constituted the first and most ambitious corpus of political arithmetic, which at its height was a program of government through social engineering on a massive scale. These were his legacy. Yet when Petty died, they effectively disappeared. What remained of "political arithmetic" was the politically sanitized demographic speculation of a few short printed pamphlets. Since 1687, conceptions of political arithmetic have been formed in the absence of most of the material that first embodied it.

Petty and his papers

Until 1993, when the British Library purchased them, the Petty Papers – fifty-three chests of them – were in private hands, kept by the Lansdowne family, Petty's descendants, at Bowood House. Since then they have been comprehensively and sensitively catalogued and rearranged, and are now available to the public.[63] But with one or two exceptions the papers have not attracted any sustained or systematic attention, despite the resurgence of Petty's name in a variety of historiographical arenas. One reason for this may be the difficult nature of the archive itself: a mass of often fragmentary papers, many of which cannot be dated, and whose relationship to Petty's printed work – and therefore to the existing scholarship – is frequently

[63] The "Petty Papers" are almost all in BL MS Add. 72850-72908. Frances Harris, Curator in the Department of Manuscripts in the British Library, wrote the catalogue and has very concisely and perceptively discussed the archive in Harris, "Ireland as a Laboratory". Tony Aspromourgos, a historian of economics who has published more on Petty than anyone in the last twenty-five years, describes the archive in greater detail and at greater length in "The Mind of the Oeconomist: An Overview of the 'Petty Papers' Archive", *History of Economic Ideas* 9:1 (2001), 39-102. My own discussion is no substitute for these (and draws on them), but focuses simply on the aspects of the archive relevant to my argument.

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unclear. Another, related reason, has to do with the nature of that scholarship. This section addresses the first point; the next will address the second.

The archive contains a few volumes of correspondence and manuscripts that are recognizably drafts or versions of some of Petty's printed works, but the bulk of it is made up of short papers – a few folios at most, often only one or two – that are more difficult to place. Many are, naturally enough, merely private notes, indecipherable or nonsensical sets of figures or lists of things whose significance is irrecoverable and, in the context of the history of political arithmetic, probably minimal. Others belong in a slightly different genre: sets of "heads" (something like "headings") that list in a much more systematic fashion than mere notes various ideas Petty had, problems he sought to address or proposals he planned to make. The status of heads is ambiguous. In some cases they are simply more readable notes, meant for Petty's private use, perhaps leading ultimately to more finished and public writing but perhaps not. Others evidently circulated in their own right as summaries, reminders or advertisements of proposals spelled out more clearly elsewhere. Petty was among other things a "projector", a private purveyor of public projects; the heads in the archive provide evidence of what his projects were and also, more importantly, of how they were related.

Another, less common but notable form is the dialogue, which Petty used to debate questions of Irish policy but also, and more frequently, of ecclesiology or religious belief (several of his papers have an explicitly catechetical cast). These, again, are neither clearly private nor always public. Petty's dialogues are rarely polished – the interlocutors are usually blanks named "A" and "B" – but some of

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them certainly circulated, at least to close friends. One such dialogue, on liberty of conscience, can be found in Samuel Pepys's papers, endorsed by Pepys himself as "Sir William Petty's Paper written at my desire & given mee by himselfe a little before his Death."[64] In either case they often elucidate ideas present in more explicitly public statements elsewhere.

The most important group of papers in the archive for the present study, however, are the "little tracts" or *tractiuncli*. Typically two or three folios in length, these manuscripts number in the hundreds and dominate the archive; it seems fair to say that they are Petty's characteristic form of political expression. Each is addressed to a fairly specific problem or related set of problems, but taken together they cover widely disparate questions ranging from the Irish land settlement, to English sovereignty over the sea, to ecclesiastical and theological issues. Certain formal patterns are present through multiple tracts. In many cases papers are divided into a number of clearly distinct sections, often subdivided in turn into numbered points. A paper may begin by outlining a problem (Irish rebelliousness, for instance), calculate the cost of the problem (the cost of maintaining an English army in Ireland), propose a solution (transplanting some of the Irish), and offer a calculation of the cost of the solution; often such papers will end with a consideration of the longer-term dangers of not adopting Petty's solution, or the benefits of taking it up. Often, too, one or more of these components is missing, or the order in which they appear is different. But where two or three of them are present it seems fair to describe the whole as a proposal, and in what follows I refer to them as such.

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[64] Petty, "A Dialogue between A & B" (1687), in Bodl. MS Rawlinson A.171, ff.274-275.

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The relationship between these different genres of manuscript is often crucial to understanding instances of each type. A set of heads may summarize several proposals that are recognizable from or even identifiable with specific *tractiuncli*, and in so doing it may juxtapose papers that, taken one by one, have no obvious relationship to each other: one such summary paper is helpfully entitled "The Scope & Designe of the Papers delivered to the Earle of Tirconell the 12th May 1686 in order to an accommodation", and makes a sort of digest of several other extant manuscripts on Irish history, the land settlement, revenue-raising, and trade policy.[65] A letter may articulate a relationship between two or more ideas – the rate of population increase and the historical status of Scripture, to take one binary[66] – that initially seem completely distinct, particularly to modern eyes; here, again, apparently unrelated papers turn out to be closely connected. Reading Petty's archive in a way that makes sense of the political papers that constitute much of it means reconstructing an obscure set of relations between correspondence, heads, and proposals, without which the full significance of each is missed because it exists only in relation to a greater whole.

The *public* nature of many of the *tractiuncli* is especially important. Printed works have usually taken priority over manuscripts; more enduring and more widely available, books have often been assumed to have been more seriously meant than handwritten papers. But for the seventeenth century this is a very risky assumption.[67]

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[65] BL MS Add. 72885, ff.3-6.

[66] This occurs in Petty to Southwell, 20 August 1681, in *Correspondence*, 92.

[67] See Harold Love, *Scribal Publication in Seventeenth-Century England* (Oxford, 1993). William Sherman, *John Dee: The Politics of Reading and Writing in the English Renaissance* (Amherst, 1995), makes a similar case for prose manuscripts and even marginalia as sources in the history of political

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Politically sensitive material was subject to censorship for much of the period, and a self-preservative instinct led authors to withhold their work from the press. "Scribal publication" through the "coterie circulation" of manuscripts was a safer way to convey certain ideas and to reach certain audiences. Petty appreciated this. Many of his political-arithmetical proposals were never intended for the press, but were instead sent to friends and contacts, who made their own copies and passed them along to other friends, or upward to potential patrons and policymakers, Petty's real audience. Indeed, even Petty's best-known printed works, *Political Arithmetick* (printed in 1690) and *The Political Anatomy of Ireland* (printed in 1691) began their *public* lives in the early 1670s as manuscripts, sent from friend to friend. They were never meant for print and, while Petty lived, they never saw it.

Also important to the argument I will present is the chronological structure of the archive. Petty's manuscripts are not evenly spaced through time. There are hardly any from before 1660 – not surprising, given the political upheavals in 1659-1660 and considering Petty's close affiliation with the collapsing Cromwellian regime. Less easy to explain is the relative paucity of manuscripts from the 1660s. But most striking of all is the positive explosion of manuscripts in the three final years of Petty's life, the first three years of James II's reign. Categorizing Petty's papers is too much a matter of interpretation, and the dates of many of them too tentative, for statistical precision. But of approximately 300 manuscripts in the Petty archive at the British Library used for this study, almost fifty date definitely or probably to 1685, about 110 to 1686, (with some straddling the two years) and a further fifty to 1687,

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thought. It may be that such sources are particularly important for understanding figures like Dee – and Petty – whose wide-ranging intellectual activities are hard to categorize in modern terms.

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with the rest spread over the period 1670-1684 (there is a much smaller cluster of papers around the dates 1670-1675). In other words, more than two thirds of the manuscripts used come from the last three years of a roughly seventeen-year period of political-arithmetical writing. Obviously, I have been selective, but my criteria stressed the coherence and integrity of the manuscripts, not their dates of composition, and in my treatment I have if anything placed too much emphasis on the earlier papers. Even allowing for the accidents of survival, the pattern is hard to deny. Ideas shaped the archive, but so did events.

The form of Petty's work was intimately related to its content and purposes, and a contextual reconstruction of the political-arithmetical corpus of manuscripts has implications for the meaning of political arithmetic itself. The Petty archive is too large for this study to be anything more than a partial reconstruction, and I have focused on proposals that are connected in some way – in heads, in correspondence, or internally to the proposals themselves – with political arithmetic as Petty used the term. Within this group I have favored less familiar ideas over those more accessible in existing studies and widely available printed works. I have also tried to stress ideas that were *essential* to his concept of political arithmetic, rather than merely compatible with it. Petty had a lot to say about trade and revenue, but he said much of it in print well before he ever wrote the words "political arithmetic", and it is well documented in the secondary literature on the history of economics. Other ideas, particularly about the "transplantation" and especially the "transmutation" of human populations, on the other hand, developed in close connection with political arithmetic, and yet appear nowhere in the existing historiography. A truly

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comprehensive study of Petty would synthesize the familiar and the unfamiliar, the old research and the new. I cannot offer such a synthesis here, but one of my aims is to make it possible by recovering the missing half of the story.

Petty's afterlives

Why does Petty, or his political arithmetic, matter now? Some of the answers to this will already be clear. Historians of Ireland have an obvious interest in someone who literally mapped out Cromwell's conquest, possibly the pivotal event of the seventeenth century for Irish political geography, at least before William's victories at the Boyne and Aughrim.[68] Some have gone further, considering Petty's activities and significance as a planter and "improver" of his own estate in south Kerry,[69] as a bridge between the New Philosophy in England and Ireland through his ties to Hartlib's circle and later to the Dublin Philosophical Society,[70] as a judge of the Irish

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[68] The classic nineteenth-century work is John P. Prendergast, *The Cromwellian Settlement of Ireland* ([1865], rpr. London, 1996). For more up-to-date treatments of the settlement and Petty's role in it see Bottigheimer, *English Money and Irish Land*; Bottigheimer, "The Restoration Land Settlement in Ireland: A Structural View", *Irish Historical Studies* 18:69 (1972), 1-21; Barnard, "Conclusion: Settling and Unsettling Ireland: The Cromwellian and Williamite Revolutions", in Ohlmeyer (ed), *Ireland from Independence to Occupation*, 265-291. Barnard's now classic study *Cromwellian Ireland: English Government and Reform in Ireland, 1649-1660* (Oxford, 1975) contains valuable comments on both the settlement and Petty's milieu in the Ireland of the 1650s; see also Barnard, "The Protestant Interest, 1641-1660", in Ohlmeyer (ed.), *Ireland from Independence to Occupation*, 218-240.

[69] Toby Barnard has traced this theme in a number of essays. See especially Barnard, "Planters and Policies in Cromwellian Ireland", *Past and Present* 61 (1973), 31-69; Barbard, "Sir William Petty, his Irish Estates and Irish Population", *Irish Economic and Social History* 6 (1979), 64-69; Barnard, "Sir William Petty, Irish Landowner", in Lloyd-Jones, Pearl, and Worden (eds.), *History and Imagination: Essays in Honour of H.R. Trevor-Roper* (London, 1981), 201-217; Barnard, "Fishing in Seventeenth-Century Kerry: The Experience of Sir William Petty", *Journal of the Kerry Archaeological and Historical Society* 14 (1981), 14-25; Barnard, "Sir William Petty as Kerry Ironmaster", *Proceedings of the Royal Irish Academy* 82C:1 (1982), 1-32. See also H. Wood, "Sir William Petty and His Kerry Estate", *Journal of the Royal Society of Antiquaries of Ireland* 64 (June, 1934), 22-40.

[70] See K. Theodore Hoppen, "The Royal Society and Ireland, [1]: William Molyneux, F.R.S., 1656-1698", *Notes and Records of the Royal Society of London* 18:2 (1963), 125-135; Hoppen, "The Royal

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admiralty court,[71] or as a source of information on the shape of seventeenth-century Irish society and population.[72] But on the whole Petty's place in Irish historiography depends on the Down Survey and is, indeed, ancillary to it; his name is familiar, but other than the Survey the details of his life are mostly obscure. Petty's situation in the history of science is similar: he is a name connected with bigger names and representative of bigger trends, not an object of study in his own right. He participated in important institutions – the "1645" Group, the "philosophical club" at Oxford, the Royal Society and its Irish counterpart; he knew many of the big men of his time – Hobbes, Mersenne, Hartlib, Boyle, Hooke; he participated in the trends that define the "scientific revolution" – in medicine, in his ideas on education, in his use of experimental method, in his proposal of "doubting" St. Thomas as patron saint of

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Society and Ireland, 2", *Notes and Records of the Royal Society of London* 20:1 (1965), 78-99; Hoppen, "Sir William Petty: Polymath 1623-1687", *History Today* 15:2 (February, 1965), 126-134; Hoppen, *The Common Scientist in the Seventeenth Century: A Study of the Dublin Philosophical Society, 1683-1708* (Charlottesville VA, 1970); Hoppen, "The Hartlib Circle and the origins of the Dublin Philosophical Society", *Irish Historical Studies* 20:77 (1976), 40-48; Barnard, "The Hartlib Circle and the Origins of the Dublin Philosophical Society", *Irish Historical Studies* 19:73 (1974), 56-71; also see Barnard's "Miles Symner and the New Learning in Seventeenth-Century Ireland", *Journal of the Royal Society of Antiquaries of Ireland*, 102:2 (1972), 129-142. For the background on the Hartlib group's involvement in Ireland, see Christopher Hill, "Seventeenth-Century English Radicals and Ireland", in Hill, *A Nation of Change and Novelty: Radical Politics, Religion and Literature in Seventeenth-Century England* (London, 1990), 133-151; Elizabethanne Boran, "'Propagating religion and endeavouring the reformation of the whole world': Irish bishops and the Hartlib circle in the mid-seventeenth century", in Vincent P. Carey and Ute Lotz-Heumann (eds.), *Taking Sides? Colonial and Confessional Mentalities in Early Modern Ireland: Essays in honour of Karl S. Bottigheimer* (Dublin, 2003), 165-184.

[71] See Kevin Costello, "The Judicial Career of Sir William Petty, Judge of the Irish Court of Admiralty, 1676-1683", paper delivered at the British and Irish Legal History Conference, University College Dublin, July 2003. I am grateful to Toby Barnard for bringing this paper to my attention, and to Kevin Costello for permission to cite it.

[72] Petty's population estimates are quoted in too many places to mention. See, e.g., David Dickson, *New Foundations: Ireland, 1660-1800* (Dublin, 1987); S.J. Connolly, *Religion, Law and Power: The Making of Protestant Ireland, 1660-1760* (Oxford, 1992). Barnard's recent *A New Anatomy of Ireland: The Irish Protestants, 1649-1770* (New Haven, 2003), takes its title and to a lesser extent its theme from Petty's *Political Anatomy of Ireland* (1691).

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the Royal Society (for the sake of the group's motto, *nullius in verba*).[73] But his own works do not number among the classics of early modern science, and his inventions came to little. He is colorful, multifaceted, a man of his time, and not much more.[74]

The only field in which Petty has some claim to canonical status in his own right is history of economics. The nature of this claim, however, has relatively less to do with the late seventeenth century than with the middle of the nineteenth, when Karl Marx, who had embarked on an ambitious course of research on the history of what he called classical political economy – the economics of Smith and Ricardo –

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[73] Petty has had bit parts in debates about the relative importance of different strands of religion, economics, and philosophy for seventeenth-century science throughout the past seventy years or so. See, e.g., Richard Foster Jones, *Ancients and Moderns: A Study of the Rise of the Scientific Movement in Seventeenth-Century England* (2nd edition: Berkeley, 1965); W.E. Houghton, "The History of Trades: its relation to seventeenth-century thought as seen in Bacon, Petty, Evelyn and Boyle", *Journal of the History of Ideas*, 2:1 (1941), 33-60; Houghton, "The English Virtuoso in the Seventeenth Century [Part I]", *Journal of the History of Ideas*, 3:1 (1942), 51-73; Houghton, "The English Virtuoso in the Seventeenth Century [Part II]", *Journal of the History of Ideas* 3:2 (1942), 190-219; Theodore K. Rabb, "Puritanism and the Rise of Experimental Science in England", *Journal of World History* 7 (1962), 46-67; Rabb, "Religion and the Rise of Modern Science", *Past and Present* 31 (1967), 111-126; Kearney, "Puritanism, Capitalism, and the Scientific Revolution", *Past and Present* 28 (1964), 81-101; Barbara Shapiro, "Latitudinarianism and Science in Seventeenth-Century England", *Past and Present* 40 (1968), 16-41, Shapiro, "Science, Politics and Religion" (in "Debate: Science, Politics and Religion"), *Past and Present* 66 (1975), 133-138, and more recently Shapiro, *A Culture of Fact: England, 1550-1720* (Ithaca, 2000); Robert K. Merton, *Science, Technology and Society in Seventeenth-Century England* (New York, 1970); Richard S. Westfall, *Science and Religion in Seventeenth-Century England* (Ann Arbor, 1973); Webster, *The Great Instauration*; Webster, "Puritanism, Separatism, and Science", in David C. Lindberg and Ronald L. Numbers (eds.), *God and Nature: Historical Essays on the Encounter between Christianity and Science* (Berkeley, 1986), 192-217; James R. Jacob and Margaret C. Jacob, "The Anglican Origins of Modern Science: The Metaphysical Foundations of the Whig Constitution", *Isis* 71:2 (1980), 251-267; Hunter, *Science and Society in Restoration England* (Cambridge, 1981); Hunter, *The Royal Society and Its Fellows, 1660-1700: the morphology of an early scientific institution* (Chalfont St. Giles, 1982); Hunter, *Establishing the New Science: the experience of the early Royal Society* (Woodbridge, 1989); Hunter, *Science and the Shape of Orthodoxy: intellectual change in late seventeenth-century Britain* (Woodbridge, 1995). In the debate over religion Petty usually becomes a Puritan, Anglican, latitudinarian, agnostic, or atheist as required, though it is only fair to add that he seemed to many to do the same in life. For my discussion of his attitude to religion, see Chapter 5, below.

[74] To a limited extent Sharp's unpublished thesis, "Sir William Petty and Some Aspects of Seventeenth-Century Philosophy", is an exception; see also Robert Kargon, "Sir William Petty's Mechanical Philosophy", *Isis* 56:1 (1965) 63-66, and Hoppen, "Sir William Petty: Polymath". But only to a limited extent: the point is still to see how far Petty did or did not fit paradigms set by bigger names. The question of how he understood what he was doing – not the only important question, to be sure, but the question I am interested in – remains unanswered.

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discerned in Petty's printed works, particularly the *Treatise of Taxes* and *Political Arithmetick*, the crucial elements of this bourgeois science.[75] These were mostly elements of a theory of value centered on labor: Petty's comments on the origin of value, its embodiment of labor, on the commodity nature of gold and silver money, and on rent. For Marx, Petty was an early and perceptive interpreter of bourgeois economic relations at a moment when they were not yet so dominant as to seem self-evident, as they would become for Smith and Ricardo. Marx's mission, which was to highlight the contingency of both bourgeois economic relations and the classical political economy that expressed them, was well served by Petty, whose strengths and weaknesses revealed the historical roots of this economics equally well.

It was only in the wake of Marx and the scholarly reception of his own work that the study of Petty really developed, and it was historians of economics who developed it. The 1890s saw the first lengthy articles on, and the consolidation of, Petty's own "economics"; this was the context in which his first and only major biography appeared, and the spur to the collection in 1899 of his "economic works" in two volumes.[76] From then until today, evaluations of Petty's economic theory, using the sources gathered in the *Economic Writings* of 1899, have dominated the

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[75] The Epilogue returns to this subject.

[76] See Wilson Lloyd Bevan, "Sir William Petty: A Study in Economic Literature", *Publications of the American Economic Association* 9:4 (1894), 13-102; Hull, "Graunt or Petty?", which touched off the modern authorship debate; Hull, "Petty's Place in the History of Economic Theory", *Quarterly Journal of Economics* 14:3 (1900), 307-340. The biography was Fitzmaurice's *Life of Sir William Petty* mentioned above. From the point of view of subsequent historiographical developments, by far the most important product of the first years of Petty scholarship was Hull's edition of *The Economic Writings of Sir William Petty* (Cambridge, 1899), in reprint (Fairfield, NJ, 1986) still the most commonly available point of access to Petty [hereafter simply *EW*].

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limited literature devoted to him.[77] The topics of interest have broadened, but it remains the case that his place in history rests on his contribution to economics, a contribution properly evaluated in terms of current theory.[78]

From the point of view of present-day economics there is nothing wrong with this approach. Understanding the origins of ideas still applied in the present is valuable for any discipline, and most modern disciplines that claim to have accumulated a core of objectively or intersubjectively valid theoretical knowledge over time have accounted for this accumulation through this type of history: the history of science, the history of medicine, the history of demography, and so on (to name just a few of those most relevant to Petty). The cost of this sort of "progressivism" is simply the flip-side of its benefit: it says more about the present than it does about the past. For a long time, the gain seemed paramount, and in many

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[77] William Petty (and/or political arithmetic, which in this context is often simply synonymous with Petty's *Economic Writings*) is a regular station stop on the road to Adam Smith (and/or scientific economics): see for instance E.A.J. Johnson, *Predecessors of Adam Smith: The Growth of British Economic Thought* (New York, 1937); William Letwin, *The Origins of Scientific Economics* (New York, 1965); Andrea Finkelstein, *Harmony and the Balance: An Intellectual History of Seventeenth-Century British Economic Thought* (Ann Arbor, 2000). I do not mean to disparage these works, many of which pay attention to the economic and even the political circumstances in which Petty wrote (Letwin's book is particularly valuable in this respect). My point is that by the very nature of their inquiry they are chiefly interested in the relationship between Petty's own "economics" (however compromised by contemporary political or private interests) and that of later, usually better, economists. Their standpoint is inevitably retrospective (see my comments on Mark Blaug, below) because their real subject is almost invariably present-day economics.

[78] This remains true even for Tony Aspromourgos, who has shown greater sensitivity to Petty's historical situation than most writers, and especially since the "Petty Papers" became publicly available. Compare Aspromourgos, "Political Economy and the Social Division of Labour: The Economics of Sir William Petty", *Scottish Journal of Political Economy* 33:1 (1986), 28-45; Aspromourgos, "The Life of Sir William Petty in Relation to His Economics: A Tercentenary Interpretation", *History of Political Economy* 20:3 (1988), 337-356; Aspromourgos, "New Light on the Economics of William Petty (1623-1687): Some Findings from Previously Undisclosed Manuscripts", *Contributions to Political Economy* 19 (2000), 53-70; Aspromourgos, "Political Economy, Political Arithmetic and Political Medicine in the Thought of William Petty", in Peter D. Groenewegen (ed.), *Physicians and Political Economy: Six Studies in the Work of Doctor-Economists* (New York, 2001), 10-25.

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quarters this present-centered approach still seems a crucial guarantee of history's relevance.

From the 1960s on, however, a reaction began to stir, famously marked in the history of science by Thomas Kuhn's epoch-making work *The Structure of Scientific Revolutions*,[79] and greatly elaborated, deepened, and complicated by subsequent waves of methodological revision. Historians began to spend less time retelling grand narratives of disciplinary progress and to pay more attention instead to the political, social, and cultural contingencies that rooted the foundations of modern theory in specific historical moments, and tied them to alternatives now forgotten or lost altogether. Newton's theory of gravitation was now set alongside his alchemical pursuits, Galileo's telescope next to his courtly ambitions.[80] Modern definitions of science turned out to obscure more than they revealed about early-modern practice when they rigorously excluded from serious attention things like alchemy and natural magic, things that often mattered a great deal to the people being written about. Disciplinary history did not disappear, but it no longer looked very good as *history*.

In intellectual history, the work of Quentin Skinner and John Pocock had a similar effect, stressing the political contexts within which theorists like Hobbes and Harrington worked and to which they addressed their works, and the historical specificity of their conceptual vocabulary.[81] The history of economic thought before

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[79] Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago, 1962).

[80] For these two examples in particular see Betty Jo Teeter Dobbs, *Foundations of Newton's Alchemy, or 'The Hunting of the Greene Lyon'* (Cambridge, 1975), and Mario Biagioli, *Galileo, Courtier* (Chicago, 1993). Of course this account drastically foreshortens generations of development and divergence in the history of science, but my point is a broad one.

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the eighteenth century, however, has been much slower to change.[82] The major works in the field, rather than examining the contemporary meaning of seventeenth-century writing on economic topics, or elucidating the content and significance of the seventeenth-century vocabulary, almost without exception seek in the seventeenth century the roots of a methodology their authors universally agree was only fully realized in the later eighteenth. Mark Blaug's massive *Economic Theory in Retrospect*, now in its fifth edition, is in title and contents alike a good representative of the reigning methodological orthodoxy.[83] Blaug is acutely critical of economists who dismiss the early history of their discipline as unworthy of attention, but equally critical of historicist attempts to study it in its own right, outside the frame supplied by current theory, an endeavor which clearly strikes him as antiquarian.[84] He propounds instead a sort of modified or critical progressivism. This makes generous allowances for stylistic archaisms in past economists but nevertheless insists on evaluating their contribution to present theory in a literal sense. Or, rather, a numeral sense, for a typical procedure is to translate both old and new ideas into mathematical formulae, so that the conversation between past and present takes place outside of time altogether. This is an efficient way to grasp the present significance of the texts

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[81] For a clear exposition of the methodology associated with the "Cambridge School" approach to the history of political thought, see the essays in Skinner, *Visions of Politics*, I: *Regarding Method.*

[82] For the eighteenth century and beyond it is a different story. See for instance Donald Winch, *Riches and Poverty: An Intellectual History of Political Economy in Britain, 1750-1834* (Cambridge, 1996); Emma Rothschild, *Economic Sentiments: Adam Smith, Condorcet, and the Enlightenment* (Cambridge, MA, 2001).

[83] Mark Blaug, *Economic Theory in Retrospect* (5th edition: Cambridge, 1996). All references are to this edition.

[84] Blaug, *Economic Theory in Retrospect*, 1-9.

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under study, but it is equally efficient at obliterating the meaning they had in the context of their own time.

The distance between this sort of operation and the intellectual history of a Skinner or a Pocock becomes clear when Blaug himself writes that

> Marx the economist is alive and relevant today in a way that none of the other writers are that we have thus far considered. Marx has been reassessed, revised, refuted and buried a thousand times but he refuses to be relegated to intellectual history.[85]

When it comes to Petty, Blaug is not alone in fearing "relegation." But there is in principle no difference between studying Newton's alchemy or Galileo's court tricks and asking what besides the timeless principles of taxation Petty had on his mind when he wrote, say, his *Treatise of Taxes*. If this approach adds to our understanding of one, why not of the other?[86]

Recent work in the history of science, intellectual history, and literary studies has shown renewed interest in Petty's work, particularly regarding the measurement and regulation of populations.[87] Petty and political arithmetic have much to say about the growth of "governmentality" and the rise of the "information state";[88] Tony Aspromourgos, whose own work starts from the more traditional point of view of the

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[85] Blaug, *Economic Theory in Retrospect*, 215.

[86] This sort of rereading of ostensibly economic texts has in fact begun in recent years to generate a fair amount of secondary work by literary scholars. Mary Poovey, *A History of the Modern Fact: Problems of Knowledge in the Sciences of Wealth and Society* (Chicago, 1999), deals most directly with Petty; see below. See also David Glimp, *Increase and Multiply: Governing Cultural Reproduction in Early Modern England* (Minneapolis, 2003).

[87] See especially Poovey, *A History of the Modern Fact*; Glimp, *Increase and Multiply*; Andrea Rusnock, "Biopolitics: Political Arithmetic in the Enlightenment", in William Clark, Jan Golinski, and Simon Schaffer (eds.), *The Sciences in Enlightened Europe* (Chicago, 1999), 49-68.

[88] See Edward Higgs, *The Information State in England: The Central Collection of Information of Citizens since 1500* (Basingstoke, 2004).

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history of economics, nevertheless credits Petty with a significant role in "constructing modernity." Those less given to Foucauldian analyses have nevertheless increasingly acknowledged the importance of political arithmetic in the growth of the modern state apparatus, whether informational, fiscal-military, or otherwise.[89] All of this implicates Petty. The most important new factor, however, is a simple matter of sources. In the last dozen years the evidentiary base for a study of Petty – which hitherto included, for most scholars,[90] only Hull's edition of the *Economic Writings* plus an abbreviated selection of manuscripts and a more comprehensive edition of Petty's correspondence with Robert Southwell – has expanded geometrically. In terms of both the evidence and the analytical tools available to them, historians are today much better equipped to evaluate the meaning of political arithmetic than ever before.

Political arithmetic in and out of print

Political arithmetic is a difficult concept to define. Petty invented the phrase, and it is normally associated with the book of the same name, which he circulated in manuscript in the 1670s and which his widow printed, on the advice of his best

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[89] Peter Buck was ahead of the field in his treatment of political arithmetic from this point of view; see Buck "Seventeenth-Century Political Arithmetic: Civil Strife and Vital Statistics", *Isis* 68:1 (1977), 67-84, and Buck, "People Who Counted: Political Arithmetic in the Eighteenth Century", *Isis* 73:1 (1982), 28-45. Paul Slack's recent "Government and Information in Seventeenth-Century England", *Past and Present* 184 (2004), 33-68, pays more attention to the details of political arithmetic's application to policy. Also see Geoffrey Holmes's comments in his "Gregory King and the Social Structure of Pre-Industrial England", in Holmes, *Politics, Religion and Society in England, 1679-1742* (London, 1986), 281-308. Julian Hoppit, "Political Arithmetic in Eighteenth-Century England", *Economic History Review* 49:3 (1996), 516-540, takes a broader view of what political arithmetic could mean in the late seventeenth and especially the early eighteenth century.

[90] The major exceptions being Fitzmaurice (whose family owned the papers), Toby Barnard (who was interested mostly in Petty's estate management), and Lindsay Sharp.

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friend, in 1690. Because the book and much of Petty's other printed work using the phrase deals with broad questions about the size and relative strength of English economic resources – principally land and population – and with trade, it has seemed plausible to use political arithmetic as a catch-all for Petty's "economic thought" or, occasionally, his "statistics" or "demography"; essentially, what everyone seems to agree on is that it involved quantification of "lands and hands" and served, somewhat vaguely, the purposes of government. Such an interpretation is all the more defensible since this is, broadly speaking, exactly how Petty's successor-political arithmeticians in the 1690s and 1700s used the term, in printed works that dealt, like his own, with population, taxation, and trade.[91] The problem with this is that neither economics, nor statistics, nor even demography existed when Petty started writing, so that it is impossible that he understood political arithmetic in quite this way himself. Even Davenant's definition of it in 1698 as "the Method of Reasoning by Figures, upon Things relating to Government"[92] – which fits current academic usage reasonably well – postdated Petty's first work by nearly thirty years, emerged from circumstances wildly unlike those Petty wrote in, and was articulated in the course of an essay arguing explicitly *against* Petty's work. The counter-problem, however, is that Petty never clearly said what he himself thought about it, though he gave some hints. What we are left with is an idea of Petty's that only seems to gain in clarity once Petty himself recedes into the historical distance.

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[91] Their reception of Petty and political arithmetic is the subject of Chapter 6, below.

[92] Davenant, *Discourses on the Publick Revenues*, 2.

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The research for this dissertation began with a systematic examination of Petty's manuscripts that aimed at reconstructing Petty's view of political arithmetic by setting his papers alongside his books and reading both in the context of Anglo-Irish politics from the Protectorate through the reign of James II. What has resulted is a more refined study of a central aspect of Petty's manuscript political arithmetic that emerges in manuscripts of the early 1670s, lasts until Petty's death, and is bound up with the politics of the Irish settlement, of colonial governnment more generally, and the politics of religion throughout the three Stuart kingdoms under James II. This strand of political arithmetic, which develops mostly in the manuscripts, is closely tied to more familiar aspects of Petty's work – especially his apparent emphasis on quantification and his interest in population. But unlike the proto-economic political arithmetic familiar from the history of economics, this manuscript political arithmetic aimed not at accurately picturing the state of the economy or fostering trade or manufactures but at something of another order altogether: at what Petty repeatedly called "transmuting the Irish into English."

Transmutative political arithmetic, as I will refer to it from here on, was not so much an early attempt at economics as an early and extremely ambitious project of social engineering. Petty's schemes, as many historians have pointed out, often involved a fairly detailed knowledge of the relative numbers of different social, national, and religious groups within a population. But this mere enumeration, sometimes hailed as Petty's contribution to social science, was just a means to the vastly more impressive and important end of transforming the population in question, both quantitatively and qualitatively. In the case of Ireland, whose political problems

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were the inspiration for the whole project and for a long time its only field of application, the "transmutation" would involve large and forcible exchanges of population (paradigmatically, young, unmarried, fertile women) between England and Ireland, intermarriage, and procreation. Over a period of years these exchanges and "mixtures" would reduce the relative demographic preponderance of troublesome kinds of people (here, poor Irish Catholics), replacing some of them outright with loyal English women and "transmuting" the rest through the influence of these women as wives and, especially, as mothers. Transmutative political arithmetic was designed to smooth political instability by directly manipulating populations.

Reading Petty in the context of Anglo-Irish Restoration politics, rather than that of economics, makes transmutative political arithmetic seem a lot less preposterous. Chapter 2 looks at Petty's relationship to both the economic writing of his time and the older tradition of English writing on Irish plantation, concluding that Petty's project is best seen as one of many attempts to make Ireland British, comparable to a great extent with the ideas of earlier writers like Edmund Spenser or Sir John Davies. Like Davies in particular, Petty wrote in the aftermath of a long and costly Irish war with the hope of laying down the principles of a lasting peace. But unlike Davies, Petty had no faith that the simple extension of English institutions to Ireland – which had, after all, failed to prevent the rebellion of 1641 – would guarantee lasting stability. Intstead he proposed transmutative political arithmetic as a way to remove the political sting of religious and cultural difference and, ultimately, to remove the difference itself. Petty's population exchange, accompanied by the institution of religious toleration and the material improvement of Irish living

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conditions, would reconcile the Irish to English rule by uniting Irish and English interests – first in the persons of young English women, and subsequently in the lasting union of the nations themselves. Transmutative political arithmetic was a new solution to a very old political problem.

Yet the language Petty used to describe his project was distinctive. Chapter 3 explores the origins and significance of Petty's use of "transmutation" and affiliated alchemical or "chymical" concepts[93] – "proportionable mixture" and "union" – in his program of demographic manipulation. Looking more closely at his medical training, his association with Samuel Hartlib and other members of Hartlib's circle, his work for the Royal Society and his wider intellectual milieu, I argue that while Petty cannot be reliably identified as an alchemist or a chymist, the language and concepts of alchemy and chymistry were familiar to him from his medical training and perhaps even his family background in the dyeing trade. Further, it seems that his whole vision of Irish politics and indeed of the means of governing any internally divided population depended on his ability to conceive of populations in chemical terms. Transmutation, in short, was more than a metaphor for Petty; it was an idiom essential to the expression of his ideas.

If we think of Petty as an eccentric who dreamed of wool walls and double-hulled ships, it is easy to dismiss this transmutation as simply the most preposterous of many preposterous schemes that clouded his later years. But, as I argue in Chapter 4, there are good reasons for thinking that this is a mistake. Petty can be shown to have circulated many of the manuscripts that discuss elements of transmutative

[93] For the use of these terms see Chapter 3, below.

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political arithmetic among officials he thought capable of implementing the policy, and many more papers are likely to have circulated, or been designed to circulate, in the same way. Further, although the most striking evidence comes from the unpublished manuscripts, a surprising amount is available in Petty's printed works. In fact, one of the first and probably the clearest expositions of the project comes in the middle of *The Political Anatomy of Ireland*, one of Petty's best-known texts – and one that circulated widely and rapidly to such men as the Earl of Essex, then Lord Lieutenant of Ireland. The project of transmuting the Irish into English is visible as never before in light of the Petty Papers; but that it was invisible before now has nearly as much to do with the way the available sources have been read – by the limited light of disciplinary history – as with the range of sources available.

Chapter 5 explores some of the ways Petty's ideas developed in different contexts after the initial elaboration of transmutative political arithmetic in the early 1670s. Two different extensions of political arithmetic are especially interesting. The first, Petty's engagement with English plantation in North America, is revealing as a *failure* to extend political arithmetic. Just as in Ireland, Petty sought information on the English and Native American populations, and particularly on the religious and broader cultural differences between them. But in Ireland, the problem was unifying a population divided in part by what earlier writers called degeneration. In America, it was the opposite problem of maintaining the integrity of an English population against both the physical assaults and the cultural temptations of an alien Native American population. Transmutative political arithmetic fit Irish plantation, but not American, because it was a tool for governing subject populations, not conquering

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new ones. The second part of the chapter looks at a very different extension (almost a reversal) of political arithmetic, under James II, whose policy of toleration and increasing reliance on Catholic advisors undermined both the Irish settlement and the stability of his own rule. Forced to choose between the settlement and the king, Petty ultimately opted for the latter. His last political-arithmetical proposals replace "the transmutation of the Irish into English" with "the Catholication [sic] of the Three Kingdomes". Yet I argue that this apparent backtracking, far from betraying political arithmetic, brought out more clearly the principle of proportionable mixture on which it, and in Petty's view all hope of political stability, was based. Further, although Petty did not live to see it, it is arguable that the Glorious Revolution justified his fears precisely.

The final chapter looks at the fate of political arithmetic in the absence of Petty – and, crucially, of his manuscripts – after 1688. Petty's self-proclaimed successors, especially Gregory King and Charles Davenant, wrote in a very different context from Petty's – a context that Petty, in fact, had designed transmutative political arithmetic to prevent. The Irish Catholic political threat had been crushed, first by military force, and then, after 1695, by the political dominance of a reactionary Protestant Irish Parliament; neither conciliation nor transmutation was a relevant concern. Further, the successors themselves were of a very different make from Petty. Davenant, whose definition of political arithmetic continues to set the agenda for historical treatments of the subject, was a former Excise Commissioner and future Inspector General of Imports and Exports – not a Restoration virtuoso but an Augustan civil servant. With Gregory King, he redefined Petty's political

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arithmetic, as gathered from the small corpus of printed works, as a putatively apolitical tool of bureaucratic administration. No longer a political program with content of its own, it became a method of calculation. Transmutative political arithmetic disappeared, and a chastened Petty rejoined the road to the scientific economics of Smith, Ricardo, and Marx.

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2: The Invention of Political Arithmetic: 1670-1675

> *A*: Whence come you?
> *B*: [F]rom reading a manuscript that contaynes the plainest politics I ever yet heard of.[94]

Since 1690, when it was first printed, William Petty's *Political Arithmetick* has been read as a treatise, a compendium of usable data and doctrines on economic questions, meant for public consumption, directed to the common weal of England and "perhaps of *Mankind*."[95] Together with his 1662 *Treatise of Taxes and Contributions* and other printed work it constituted a major contribution to the intellectual development of a discipline known to the eighteenth century as political arithmetic, to the nineteenth century as political economy, and to the twentieth century as economics.[96] This legacy of reception is unrelated to Petty's own intentions: his printed work, most of which was printed posthumously, was read because it had something to add to a lively and growing public discourse on economic questions, not – until much later, at least – for its historical interest.[97] The

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[94] Petty, "A Dialogue on Political Arithmetic", 1675, in BL MS Add. 72865, f.94. The dialogue is printed in S. Matsukawa (ed.), "Sir William Petty: an unpublished manuscript", *Hitotsubashi Journal of Economics* 17 (February, 1977), 33-50.

[95] *Political Arithmetick*, epistle dedicatory by Charles Petty, Baron of Shelburne (*EW*, 240). Page references are to the 1690 edition and, parenthetically, to Hull's reprint in his edition of *The Economic Writings of Sir William Petty*, 2 vols. (Cambridge, 1899), which is widely accessible in reprint (Fairfield, NJ, 1986) [hereafter *EW*]. Both faithfully transcribe of the body of text in the manuscript, the authoritative copy of which is BL Add. MS 21128; it is the way the printed editions frame the text that is misleading.

[96] Phyllis Deane, *The State and the Economic System: An Introduction to the History of Political Economy* (Oxford, 1989), 23, is particularly unambiguous: "What Petty and his followers called 'political arithmetic' and defined as 'the art of reasoning upon things related to government' was an economic research programme which represented the beginnings of an objective discipline of applied economics."

[97] The use of Petty as a source of historical *statistics*, however, goes back much further, beginning in his own lifetime with figures like the Duke of Ormond and later with writers such as Gregory King.

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circumstances of its initial circulation in the 1670s, therefore, have attracted little attention. And in case an explanation for the work's nineteen-year sojourn in manuscript were thought necessary, Petty's seventeen-year-old son Charles, Baron Shelburne, had provided one in the dedicatory epistle to the first printed edition: "Had not the Doctrins of this *Essay* offended *France*, they had long since seen the light, and had found *Followers*[.]"[98] Shelburne also supplied a title that summed up the range of the economic questions the book addressed:

> Political Arithmetick, or A Discourse Concerning, The Extent and Value of Lands, People, Buildings; Husbandry, Manufacture, Commerce, Fishery, Artizans, Seamen, Soldiers; Publick Revenues, Interest, Taxes, Superlucration, Registries, Banks; Valuation of Men, Increasing of Seamen, of Militia's [sic], Harbours, Situation, Shipping, Power at Sea, &c. As the same relates to every Country in general, but more particularly to the Territories of His Majesty of Great Britain, and his Neighbours of Holland, Zealand, and France.[99]

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[98] *Political Arithmetick*, epistle dedicatory by Charles Petty; see Hull's comments, *EW*, 237-238. There is no evidence for the truth of Shelburne's statement and considerable evidence against it, although it matters little: the manuscript circulated, unprinted, for the better part of two decades, in the manner described in Chapter 2 above, and whatever influence it had in Petty's lifetime was in this context. Petty rejected his friend Sir Robert Southwell's advice to print it in 1678, and a similar entreaty by John Aubrey three years later: "I am not forward to Print my Political Arithmaticke, but doe wish that what goeth abroad were compared with the Coppy in Sir R. Southwell's hand, which I corrected in March 1679/80." (Petty to Aubrey, 12 July 1681, BL MS Egerton 2231, ff.92-4.) When a corrupt version did appear in print in 1683 (under the title of *England's Guide to Industry* and attributed to "A Person of Quality") it was without Petty's authorization. In fact it was only the threat of further unauthorized editions that ultimately led Petty's widow to seek advice from his friend and her cousin, Sir Robert Southwell, on whether to authorize a printing. This was the origin of the edition of 1690. See *EW*, 237-238. Petty's fear of offending the French, if it ever existed, seems to have disappeared by 1681, when he published *The politician discovered, or, Considerations of the late pretensions that France claims to England and Ireland, and her designs and plots in order thereunto in two serious discourses* (London). This was, it is true, printed pseudonymously ("by a true Protestant and well-wisher of his countrey"). But there remains the question of why *Political Arithmetick* should not also have been so printed. Petty's specific reliance on manuscript circulation calls for a better explanation.

[99] *Political Arithmetick*, title page (*EW*, 233).

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This veritable catalogue of commercial and fiscal themes shows what Petty's work looked like to a reader in 1690, after the Revolution had swept through the Three Kingdoms, and in the midst of European war: a timely guide to the economic capacity of the English fiscal-military state.[100] But neither the long title nor its connotations is any evidence of what the book or the many other manuscripts that made up political arithmetic in the 1670s and 1680s were originally meant to do.

This chapter deals with the foundational works of political arithmetic – two familiar and several lesser-known manuscripts of the early and mid-1670s – and with the political and intellectual context in which they were produced. There is sense in treating the works of the earlier 1670s as a distinct group: in contrast with Petty's later, shorter tracts, both the early manuscripts are relatively sustained and coherent works. They tend to reveal more than the later *tractiuncli* about the basic assumptions and guiding framework within which Petty was working. Perhaps in consequence they also relate more evidently to Petty's contemporaneous work in other areas, principally natural philosophy, as well as his earlier work on such varied topics as the history of trades, the Irish settlement, and population. The next chapter will look at those connections in detail. For the moment, I will simply try to illuminate the circumstances in which *Political Arithmetick* first appeared, and to indicate the wider

[100] Geoffrey Holmes, for instance, writes that "[A]s late as 1688 its distinguished practitioners had been few. However, over the next six or seven years what had started as a largely academic study received the stamp of deadly earnestness from the War of the League of Augsburg." ("Gregory King and the Social Structure of Pre-Industrial England", in Holmes, *Politics, Religion and Society in England, 1679-1742* (London, 1986), 281-203; 285.) This is wrong: political arithmetic had never been an academic study. Petty invented it twenty years after leaving his (briefly-held) post at Oxford, and neither Sir Peter Pett nor anyone else who practiced it before 1688 did so in a university setting. Only in the eighteenth century would this change. Holmes is right, however, to indicate that the Williamite wars raised the public profile, while narrowing the significance, of political arithmetic.

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politics and corpus of texts to which it belonged and which constituted political arithmetic as a program.

The context of debate

Political Arithmetick was not written in a vacuum. When Petty began to circulate it, probably early in 1673, there were a number of personal, political and intellectual circumstances that propelled his efforts. In Ireland, where he was then living,[101] the government had been in a state of flux since the Duke of Ormond departed under a cloud in 1669.[102] The appointment of the committed, intelligent and respected Earl of Essex in 1672 was good news for Petty, bringing with it the promise of stability and therefore the possibility of reform. Yet the Acts of Settlement on which Petty's wealth and ideas alike were based were under renewed threat in London, where Richard Talbot (the future Earl of Tyrconnell) now agitated against them at court. At the same time, English politics seemed headed for crisis. The so-called "Cabal" ministry, centered on the Earl of Arlington, which had dominated government since Clarendon's fall in 1667, was disintegrating in its turn.[103] Royal

[101] Petty was in Ireland from early 1652 to early 1658, again for part of 1658-9, from early 1666 to late 1673, from mid-1676 to early 1681 (with a few visits to London), and from mid-1683 to mid-1685. See *EW*, xv-xxx.

[102] See J.I. McGuire, "Why Was Ormond Dismissed in 1669?", *Irish Historical Studies* 18:71 (1973), 295-312; David Dickson, *New Foundations: Ireland 1660-1800* (Dublin, 1978), 11-14. McGuire argues that Ormond's dismissal was brought about in part by the King's shift away from Clarendon's staunch Church of England policy towards toleration, and in part by the machinations of disgruntled Protestant planters like the Earl of Orrery. For the English background, see John Miller, *Charles II* (London, 1991), 150ff.

[103] The "Cabal" ministry was named for its chief members: Lords Clifford, Arlington, Buckingham, Ashley, and Lauderdale. By the end of 1674 Clifford was dead, Arlington retired, and Buckingham and Ashley (Anthony Ashley Cooper, later created Earl of Shaftesbury) out of favor; Lauderdale alone remained, spending most of his time in Scotland. See Miller, *Charles II*, 212-213, 222-224. Ronald

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moves towards toleration proved dangerously unpopular and had to be reversed; both Charles II and his brother and heir, the Duke of York, were under increasing suspicion of Catholic and therefore, according to the political logic of the time, absolutist sympathies. In York's case, these suspicions were effectively confirmed by his open attendance at mass. Meanwhile, Charles was carrying on an expensive and unsuccessful war against the Dutch that had apparently been motivated in the first place less by English interests than by French pressure.[104] Worse, English failures against the Dutch at sea contrasted with the frightening success of the French on land. In short, fear of "popery and arbitrary government", whether Stuart or Bourbon, combined with fear of the mercantile and naval power of the Dutch in a particularly acute way.[105] These fears produced a wealth of books and pamphlets, among or against which Petty's work can be seen.

The most obvious of these, both historically and historiographically, are those that may loosely be called economic works.[106] Nervous English praise of the Dutch

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Hutton, *Charles II: King of England, Scotland, and Ireland* (Oxford, 1989), 254, argues that Arlington was every bit the chief minister that Clarendon had been.

[104] The Third Anglo-Dutch War, 1672-1674. The second, from 1664 to 1667, was widely regarded as a humiliation for England and for Charles II and Clarendon in particular. In 1667 the Dutch broke through defensive chains in the River Medway and caught the English fleet at anchor, unprotected – a lapse for which Petty's close friend, Sir Peter Pett, was made the scapegoat.

[105] See Tim Harris, *Politics under the Later Stuarts: Party Conflict in a Divided Society 1660-1715* (Harlow, 1993), 55-56. For a strong claim about perceptions of Charles II as an agent of the Counter-Reformation following the 1670 Treaty of Dover, see especially Jonathan Scott, "England's Troubles: Exhuming the Popish Plot", in Tim Harris, Paul Seaward and Mark Goldie (eds.), *The Politics of Religion in Restoration England* (Oxford, 1990), 107-131. For the connection between "popery" and "arbitrary government" during the Restoration see the essays in that volume generally. On the origins of the connection under Charles I see Miller, *Popery and Politics in England, 1660-1688* (Cambridge, 1973), 80-84.

[106] Here terminology poses inevitable problems. The term "mercantilism" has been used and abused so variously that offering yet another definition seems like a pointless exercise. (A survey of the problem as it stood in 1937 is given in E.A.J. Johnson, *Predecessors of Adam Smith: The Growth of British Economic Thought* (New York, 1937), Chapter 1, especially 3-9.) Nevertheless, there was a distinct

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was a major theme in economic writing of the seventeenth century, and never more so than during the Restoration.[107] Josiah Child's *Brief Observations concerning Trade, and Interest of Money* was a particularly prominent but on the whole typical example of the genre.[108] Child attributed the success of the Dutch chiefly to good policy: their use of knowledgeable merchants, "who have not onely the theoretical Knowledge, but the Practical Experience of Trade," in their state councils; state "incouragement and immunities [i.e., patents or monopolies] to the Inventors of New Manufactures" or originators of new trades; "The careful providing for, and employment of their Poor"; the efficiency of their courts; "Their keeping up PUBLICK *REGISTERS* of all Lands and Houses"; their low interest rates. Perhaps most of all,

> Their *Toleration of different Opinions in matters of Religion:* by reason whereof many *industrious People* of other Countreys, *that dissent from the Established Government of their Own Churches, resort to them with their Families and Estates, and after a few years cohabitation with them, become of the same Common interest.*

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body of writing, though not necessarily of writers, on recognizably "economic" and especially on commercial questions in the seventeenth century that often tended to see the state as the preeminent economic agent or arbiter and its strength, defined in various ways, as the principal end of policy and the legitimating value of all large-scale commercial activity. I will refer to this genre as "economic", "commercial", or "mercantile" writing as the particular aspect I wish to stress dictates. This is mostly a matter of convenience; my argument does not depend on any significant degree of agreement among "mercantilists" on specific questions, much less on a coherent doctrine of "mercantilism."

[107] Already during the 1650s the contrast between fantastic Dutch success and (as yet unfulfilled) English promise was becoming a standard trope. Petty's fellow Hartlibian and rival surveyor Benjamin Worsley compared the Dutch threat of dominance in "Universal Trade" to Spain's long-standing goal of "Universal Monarchy"; Worsley, *The Advocate: Or, a Narrative of the state and condition of things between the English and Dutch Nation, in relation to Trade, and the consequences depending thereupon, to either Commonwealth* (London, 1651), 1. See Maurice Ashley, *Financial and Commercial Policy during the Cromwellian Protectorate* (2nd ed., London, 1962), 26-27.

[108] Child, *Brief Observations concerning Trade, and Interest of Money* (London, 1668). The *Brief Observations* were incorporated into Child's later *A New Discourse of Trade* (London, 1693), a much more extended and general treatment of commercial questions. William Letwin claims, plausibly enough, that Child was "the most widely read of seventeenth-century English economic writers"; Letwin, *Sir Josiah Child: Merchant Economist* (Boston, 1959), 26.

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Besides such matters of policy, Child cited a few more properly cultural causes.[109] "Their parsimonious and thrifty Living" was a celebrated Dutch characteristic, and this was at least in part attributed to their "Education of the Children, as well Daughters as sons", particularly in arithmetic, which "doth not onely improve the Rational Faculties, but inclines those that are expert in it to thriftiness".[110]

Eli Hecksher long ago pointed out the gap between "mercantilist" perceptions of Dutch practice and the practice itself.[111] In much English economic writing of the time, the United Provinces were less obviously a real place than a symbol of the earthly realization of mercantilist ideals, and it is as an expression of these ideals that books like Child's are most revealing.[112] Such expressions were, no doubt, anchored in historical experience of the threat posed by Dutch trade if not of the details of its operation. Just as real Dutch merchants edged out real English merchants, so idealized Dutch policies highlighted the limitations of English management of trade. Debates over the interpretation of the Dutch experience in English trade writing are often primarily debates about the potential of English trade and policy. And in proportion as the "Hollanders" function less as real people than as more or less artificial congeries of policy, *policy* is where mercantile analysis begins and ends. This tendency reached its apogee in two works published by Roger Coke in 1671, the

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[109] "Culture" is a difficult term, but indispensable. I use it here to denote a range of relevant and often interrelated group characteristics not covered by political, demographic or institutional categories – beliefs, customs, habits, language, dress, and in some contexts education and religious profession. Although Child does not himself use the distinction, it is not an arbitrary interposition on my part; for Petty's grouping of these concerns, see below.

[110] Child, *Brief Observations*, 3-6. See Ashley, *Financial and Commercial Policy*, 6.

[111] Eli F. Hecksher, *Mercantilism,* 2 vols. (London, 1934).

[112] Hecksher, *Mercantilism*, vol. 1.

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first entitled *A Treatise wherein is demonstrated, That the Church and State of England, are in Equal Danger with the Trade of It*, and the second, not coincidentally, *Reasons of the Increase of the Dutch Trade, Wherein is demonstrated from what Causes the Dutch Govern and Manage Trade better than the English; whereby they have so far improved their Trade above the English.*[113] These treatises, and the first in particular, provided the rhetorical occasion for Petty's *Political Arithmetick.*

Coke positioned himself as the earnest but troubled intellectual heir of his celebrated ancestor, the jurist Edward Coke: whereas the elder Coke had had the good fortune to be able to defend England *through* its laws, the younger found himself in the unenviable position of defending England *against* them, insofar as they hampered England's ability to compete commercially with the Dutch and militarily with the French.[114] For virtually every economic writer of the period, the fundamental variable determining national wealth and strength was population: the more, the better.[115] Yet

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[113] Both published in London, 1671. The two treatises were companion pieces (the first subtitled "Treatise I" and the second "Treatise II") and were continuously paginated, though apparently separately printed, each with its own title page, preface, and epilogue. The work taken as a whole was an expansion of Coke's earlier *A Discourse of Trade. In two Parts. The first treats of the Reason of the Decay of the Strength, Wealth and Trade of England. The latter, Of the Growth and increase of the Dutch Trade above the English* (London, 1670).

[114] Coke, *A Treatise*, epistle dedicatory to John Coke. Coke is unusual, at least considered as an economic writer, in his distaste for Dissent. John Callow, "Coke, Roger (*c.*1628-1704x7)", *Oxford DNB* [http://www.oxforddnb.com/view/article/5829, accessed April 18, 2005], says little about Coke's religion. He welcomed the Restoration but came to see Charles II as a disastrous king and virulently opposed James II.

[115] Mildred Campbell, "'Of People either too Few or too Many': The Conflict of Opinion on Population and Its Relation to Emigration", in William A. Aiken and Basil D. Henning (eds.), *Conflict in Stuart England: Essays in Honour of Wallace Notestein* (London, 1960), 169-201, argues that "Population was a subject on which there was a genuine conflict of opinion" (176), but agrees that by mid-century underpopulation was the dominant concern; the first "population experts" – Petty, Graunt, Sir Matthew Hale, King and Davenant, who supported emigration to varying degrees – being the exceptions. The clearest exposition of the role of population in seventeenth-century political economy is Edgar Furniss, *The Position of the Laborer in a System of Nationalism: A Study in the Labor*

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English laws and policies often hindered the growth, and in some cases even the retention, of population. Coke's general framework causally linked policy to population, population to trade, trade to wealth, and wealth to the strength of England and, in a slight departure from the mainstream of writing on these matters (which, as in Child, was pragmatically tolerationist), the fate of the Church of England.[116]

> Greater numbers of people improve Trade: this is necessary if the nature of man be considered, in that every man is in need of being supplied in his wants by another; and so great a Providence is over industrious men, that no man, (which was not impotent) but by industry might earn every day more than would supply his necessities; and so much as any man gets by being industrious and just above what supplies his necessities, is not only so much beneficial to himself and his family, but so much enriching of the place.[117]

Richer places could defend themselves better against external and internal threats; the key was population. State and Church depended on it. And the key to maximizing population was having the right set of policies.

Coke's book therefore directed criticism at a number of specific policies harmful within this framework, in the first instance through their deleterious effects

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Theories of the Later English Mercantilists (New York, 1918), a dated work that nevertheless has not found a successor. Hecksher less anachronistically refers to mercantilism as a "system of power", but agrees on the crucial importance of maximal population or, to use the contemporary phrase, "full peopling"; *Mercantilism* (New York, 1934), vol. 2, Section II. A more recent treatment of some cultural dimensions of the theme of population in early political economy is David Glimp, *Increase and Multiply: Governing Cultural Reproduction in Early Modern England* (Minneapolis, 2003).

[116] Coke's treatise is somewhat unusual in the genre in its distaste for Dissent. Child and others thought toleration a practical way to encourage immigration – see Ashley, *Financial and Commercial Policy*, 26-27. In the preface to his first treatise Coke remarks that "he who hears not, and disobeys the Church, is to be accounted as an infidel and a Heathen", and that conformity to the established church is a duty owed to society. Not all economic writers favoured toleration, and those who did could do so for reasons ranging from the pragmatic to the principled (or, with Petty, both). Coke manages to reconcile his position with a recognition that the Dutch benefit economically from toleration; it may be that in the final analysis it is the national church and not the nation's wealth that is his greatest concern.

[117] Coke, *A Treatise*, 65.

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on population. English restrictions on naturalization, to take one example, prevented merchants from immigrating, depriving the commonwealth not only of people and their wealth in the present tense, but of their descendants and legacies as well. In so doing it decreased the amount of trade that might otherwise be brought to England, and therefore the value of lands and all that depended on them, including, as Coke mentions wherever possible, Church revenues.[118] Loss of people and of trade amounted to a loss of strength nationally, and a diminished ability to "conserve Peace and Friendship" internationally.[119] The Navigation Acts,[120] the Elizabethan poor laws,[121] restrictions on importing cattle from Ireland and Scotland,[122] colonial plantations in America, and the re-planting of Ireland in the wake of the rebellion of 1641, all drained England of much-needed labour, reduced trade, diverted resources and, by sapping national strength, "have endangered the Crown, Church, Wealth, Lands, Liberty, Trade, and Glory of England."[123]

As interesting and important as Coke's claims was the way he organized them. His entire argument was a series of Euclidean demonstrations. His dedicatory epistle asserted boldly and at length the special, challenging nature of his "Method of Reasoning (which heretofore hath been deemed impracticable, unless in

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[118] Coke, *A Treatise*, "Admonition to the Reader": "Lands are valuable, as the Trade of the Place is valuable"; "The Revenues of the Church of *England* are valuable, as the Lands of *England* are valuable."

[119] Coke, *A Treatise*, "Admonition to the Reader": "Trade is a mean to support peace and friendship."

[120] See Ashley, *Financial and Commercial Policy*, 164.

[121] Coke, *A Treatise*, 73-76.

[122] Coke, *A Treatise*, 57-63.

[123] Coke, *A Treatise*, 33.

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Mathematicks…)", comparing it to Plato's own. For Coke as for Plato, geometry was the only method that could provide certain knowledge. The preface that followed explained the doctrine of innate ideas, and an "Admonition to the Reader" set out the elements of deductive reasoning – definitions, petitions, and axioms. A further "Premonition to the Reader" gave examples of these principles in action, arrayed in propositions drawn from Book I of Euclid's *Elements*. Coke's four definitions – implicitly, the main subjects of the treatise – are law, trade, the church, and church revenues. The petitions (which, possibly in reference to the articles of the Church of England, are thirty-nine in number) include all the claims that Coke later set out to establish in the twenty-seven demonstrations that constituted the first treatise. Propositions 1-4 argue that the laws against naturalization hurt England's trade, land, strength, and church, respectively. Propositions 5-8 show the same with respect to the American plantations. Propositions 9-20 deal similarly with the Navigation Acts and other restrictive regulations on overseas trade, and Propositions 21-23 with the domestic effects of corporations or monopolies. Propositions 24-26 assail the poor laws. Proposition 27, finally, proves England's inferiority in trade versus France. The second treatise, on the rise of the Dutch, is set out along precisely the same lines, and again stresses the effects – this time positive – of policy.

Although much of Coke's argument was commonplace, his emphasis on geometry set him apart. It went beyond economic questions: Coke advocated a Euclidean education not only for its practical or professional utility in commerce, but as the basis for virtuous conduct in all aspects of life:

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> To live justly is not founded in the Principles of *Geometry* and *Numbers*; yet I say, that by knowledg in these Studies men are better enabled to live justly, than others who are more ignorant in them. For God hath made all things to consist in Number and Quantity: that man therefore who is ignorant herein, though he means justly, yet does not understand in his dealings, whether he does justly or not.[124]

The principles of geometry served this essential moral function because they alone provided the basis of certain knowledge, which, following Plato, was morally significant in itself. The very structure of Coke's work embodied this vision. Child had praised arithmetic as a practical skill and advocated the adoption of Dutch policies based, at least rhetorically, on historical evidence of their success. Coke's rhetoric raised the stakes. His book, in both form and content, advanced geometry, before history, geography, or any other type of knowledge, not only as the definitive and comprehensive guide to both individual behavior and state action, but also as the sole and sufficient principle of politics. Finding the right policy was no different from solving a mathematical problem.

Political Arithmetick: situation, trade and policy

Coke's political geometry provided a natural foil for the Petty's *Political Arithmetick*.[125] This is especially evident on the rhetorical level: arithmetic confronted geometry, and Coke's book may even explain Petty's adoption of the label of political arithmetic in the first place. But behind the language there were significant

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[124] Coke, *A Treatise*, 141.

[125] For the point that Petty was responding to Coke see *EW*, 242 n.4, and William Letwin, *The Origins of Scientific Economics* (New York, 1965), 145-146.

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differences in approach between the two writers. Petty presented his book as a corrective:

> As few dare venture their Discretions wholly to Disparage Arithmetick, So few doe think much practice of it very necessary in matter of State, otherwise then in what concerns the Revenue.[126]

It was Coke's self-consciously radical pronouncements on methodology, more than his fairly ordinary factual claims, that raised Petty's hackles. (In this respect, Petty was arguing partly from the mainstream.)[127] Petty's preface did begin by attacking, unattributed but practically verbatim, Coke's pessimistic claims about the state of England:

> That the Rents of Lands are generally fall'n; that... the whole Kingdom grows every day poorer and poorer; that... there is a great scarcity both of Gold and Silver; that there is no Trade nor Employment for the People, and yet that the Land is under-peopled; that Taxes have been many and great; that *Ireland* and the Plantations in *America* and other Additions to the Crown, are a Burthen to *England*; that *Scotland* is of no Advantage; that Trade in general doth

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[126] Petty, *Political Arithmetick*, dedicatory epistle to Charles II (reproduced in *EW*, 239 n.1). Hull suggests that this was added by Petty in 1683, prior to his presentation of the manuscript to the King, though it is present, with only minor variations in spelling and punctuation, not only in BL MS Add. 21128 (Southwell's copy, considered authoritative by Hull), but also in BL MS Add. 72865 ff.50-92, RSL MS 366 Ex.I.4., and NA SP 9/2/1, which are all dated 1671/2 or 1673. The copy in TCD MS 544, which likewise includes the epistle, is titled "Political Arithmetick: 1671 1/2", but marked "1683" elsewhere. I have not been able to check other extant copies. Whether this vitiates Hull's suggestion, or simply indicates that other manuscripts were updated with or based on BL MS Add. 21128, is impossible for me to say. Petty did update some manuscripts periodically. Regardless, the political nature of Petty's purposes is amply evident from the main body of the text and a variety of contemporaneous sources. The epistle to Charles II was replaced in the first printed edition by Shelburne's dedication to William III.

[127] James Bonar long ago spotted the similarity between Petty's analysis of Dutch success, examined below, and Sir William Temple's, whose *Essay upon the Advancement of Trade in Ireland* was written for the Earl of Essex in 1673; see Bonar, *Theories of Population from Raleigh to Arthur Young* (London, 1931), 96. Whether this is due, as Bonar thinks, to direct influence, is hard to know. Petty does not mention Temple, but it is certainly possible. It is also possible that Petty later accentuated the similarity.

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> lamentably decay; that the *Hollanders* are at our heels, in the race of Naval Power; the *French* grow too fast upon both, and appear so rich and potent that it is but their Clemency that they do not devour their Neighbors; and finally, that the Church and State of England, are in the same danger with the Trade of England[.][128]

But Petty dismissed these erroneous "Perswasions" quickly and with little effort. The colonies were flourishing (and so promoting trade, not harming it) and the Exchange was as full of merchants and the streets as empty of beggars as ever they had been.[129] If trade restrictions drove prices up, that only proved that Englishmen could afford to pay them.[130] As for the idle and factious, "That some are poorer than others, ever was and ever will be; And that many are naturally querulous and envious, is an Evil as old as the World."[131]

Petty was much more interested in talking about the *method* by which he hoped to demonstrate "that the Interest and Affairs of *England* are in no deplorable Condition." His description, revealingly, is by turns a mocking echo and an earnest critique of Coke's ponderous Euclidean pretensions:

> The Method I take to do this, is not yet very usual; for instead of using only comparative and superlative Words, and intellectual Arguments, I have taken the course (as a Specimen of the Political Arithmetick I

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[128] Petty, *Political Arithmetick*, Preface (*EW*, 241-242).

[129] Petty, *Political Arithmetick*, Preface (*EW*, 243).

[130] Petty's flippancy should raise a red flag: as a writer and, briefly, as an MP, he had actively opposed the acts restricting the importation of Irish cattle, as did his entire circle of acquaintance and patronage, from Southwell up through Ormond. Nor had this yet changed – Petty later argues against the acts in *Political Arithmetick* itself (89; *EW*, 299) on much the same grounds as Coke; the library of Trinity College Dublin (TCD MS 1180, 47-50) holds a standard Petty tract dated 1673 and entitled "Sir Wm. Petty's Argument about the Restraint on Irish Cattle Urging it a disadvantage to England." This suggests that the passage should be read more as a dismissal of Coke as a rival than a statement of Petty's positive beliefs.

[131] Petty, *Political Arithmetick*, Preface (*EW*, 244).

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> have long aimed at) to express my self in Terms of *Number*, *Weight*, or *Measure*; to use only arguments of Sense, and to consider only such Causes, as have visible Foundations in Nature; leaving those that depend upon the mutable Minds, Opinions, Appetites, and Passions of particular Men, to the Consideration of others: Really professing my self as unable to speak satisfactorily upon those Grounds (if they may be call'd Grounds), as to foretell the cast of a Dye; to play well at Tennis, Billiards, or Bowles, (without long practice,) by virtue of the most elaborate Conceptions that ever have been written *De Projectilibus & Missilibus*, or of the Angles of Incidence and Reflection.[132]

Coke's method, Petty argued, was catastrophically misplaced, his use of geometry ridiculous: one may as well try to play tennis without practicing, armed only with knowledge of the abstract mathematics involved. It is a revealing comparison. A mathematician himself, Petty would never deny that there are invisible laws accessible to geometry that govern the motions of a tennis ball. But knowledge of these principles alone was not adequate to the task at hand, which he compared not to understanding the motions of the ball but to playing the game. Where Coke offered a method of analysis that also, owing to its epistemological primacy, functioned as a guide to judgment, Petty substituted an instrument of action whose practical *use* determined its epistemological priorities.

In elevating concrete practice above abstract analysis, Petty also, perforce, stressed relative probability over absolute certainty:

> Now the Observations or Positions expressed by Number, Weight, and Measure, upon which I bottom the ensuing Discourses, are either true, or not apparently false, and which if they are not already true, certain, and evident, yet may be made so by the Sovereign Power..., and if they are false, not so false as to destroy the Argument they are brought

[132] Petty, *Political Arithmetick*, Preface (*EW*, 244).

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> for; but at worst are sufficient as Suppositions to shew the way to that Knowledge I aim at.[133]

In place of a deductive political geometry, Petty argued for a more inductive, empirical and probabilistic arithmetic. To grasp the full significance of the difference, without overestimating the importance of the specific mathematical terms involved, it is worth looking at an earlier manuscript dialogue on commodity prices, dated to sometime in the 1660s, some of which evidently went into *Political Arithmeick*. Here the sports metaphors were mixed in with a variety of other images, all of which emphasized the importance of experience essential to the kind of practical "exactness" that Petty, as opposed to Coke, sought:

> B: I see you that ayme at so much cleernes & certainty are forced sometimes to fly to estimate & opinion.
> A: Yes and to lott [i.e. casting lots] too; for in... representing a Man's face with a circle of an Inch diameter, the most Mathematicall Limner useth no scale nor Compasses but measures properties both of lines and angles by the estimat of his Eye. Upon the Violin there are no frets or divisions upon the Neck but by estimate & yet the music [is] intended to bee exact. Those that play best at Tenis & billiards use no instruments for the angles of Incidence & Reflection, At bowles there is no computation of the lines and radius which the bowles describe upon Various players according to the various position of the Center of gravity in the bowle. ... Wherefore there is more exactnes in the conjectures of some Mens hand & Eyes then in Measures or weights. And this judgment of reason to Men of grosse sensation bears the same proportion as Lott doth to the finest of all human computations.[134]

In some matters, "lott [doth] exceed computation":

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[133] Petty, *Political Arithmetick*, Preface (*EW*, 244-245).

[134] Petty, "How all persons & Things may contribute proporti[onally] to their Government & defense" (c.1660s), BL MS Add. 72865, ff.6-13, ff.7-8.

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> Where the price of any Goods are compounded of many particulars, which are also themselves not simple, & where all & Each do vary according to many circumstances not obvious to Every One, There I say the Estimate bona fide made by those of greatest practise & Experience must bee made use of, but Still wee must stick to Number Weight & Measure, till our senses & Instruments of applying them fayle us.[135]

If human reason alone might prove insufficient to calculate all the variables in the price of a commodity, the vicissitudes of politics would exceed it still more. Navigating them was an art requiring skill and practice, not a matter of geometrical demonstration. In practical politics, the educated guess of experience was the best way forward.

In *Political Arithmetick*, this meant, first, an analytical emphasis on geographical and historical context. Chapter I of *Political Arithmetick* argued "That a small country and few People, by its *Situation*, *Trade*, and *Policy*, may be equivalent in *Wealth* and *Strength*, to a far greater People and Territory".[136] The reason for this was the obvious but important one that land and people were not mere quantities (this should caution against taking the arithmetical language too literally); there were highly relevant qualitative differences between forests and bogs, on the one hand, and fields and meadows, on the other. Some land was more naturally defensible, some less. Moreover, even the quality of land was mutable – "Bog may by draining be made Meadow; Heath-land may... be made to bear Flax and Clover-grass".[137] Such differences, Petty argued, were not amenable to *a priori* treatment. They might be

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[135] BL MS Add. 72865, f.8.

[136] Petty, *Political Arithmetick*, 1 (*EW*, 249).

[137] Petty, *Political Arithmetick*, 2 (*EW*, 249).

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measured and treated mathematically, but only as they occurred in particular places at particular times. In Petty's triad "situation, trade and policy", the key addition was "situation" – trade and policy, on which Coke's analysis dwelt, existed only in particular situations, which constrained them in unique ways.

Situation was a complex idea. But it was at the core of Petty's understanding of the possibilities as well as the limits of human action in both natural and social contexts. Bridging the divide between nature and culture, it approximated to "history", or to natural history in the broad seventeenth-century chorographical sense. It included not merely the naturally occurring qualities of a particular place, but also the effects of human activity, of "improvements" like bog drainage, forest clearance, or enclosure. Situation was not only the starting point for future trade and policy but also, in part, the product of trade and of policies past. Nor was it limited to the land. People, too, differed in their natural and acquired abilities: "one Man is more nimble, or strong, and more patient of labour than another; one Man by Art may do as much work, as many without it".[138] History was also the history of populations, not only of their numbers but also of their social and cultural composition.

To illustrate the way in which "this difference in Land and People, arises principally from their Situation, Trade and Policy",[139] Petty, as Coke had done, looked at the success of the United Provinces. Petty, however, gave this well-worn topic a telling twist:

> Many Writing on this Subject do so magnifie the *Hollanders* as if they were more, and all other Nations less than Men (as to the matters of

[138] Petty, *Political Arithmetick*, 2 (*EW*, 249).

[139] Petty, *Political Arithmetick*, 3 (*EW*, 250).

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> Trade and Policy) making them Angels, and others Fools, Brutes, and Sots, as to those particulars; whereas I take the Foundation of their atchievements to lie originally in the Situation of the Country, whereby they do things inimitable by others, and have advantages whereof others are incapable.[140]

Writers who assumed the practical decisiveness (and hence the analytical sufficiency) of policy could explain Dutch supremacy in trade only by recourse to the superhuman capacities of Dutch policymakers. Petty's emphasis of the specificity of situation enabled him to go deeper. He noted first of all that "The Soil of *Holland* and *Zealand* is low Land, Rich and Fertile", which was not only good in itself but also made possible a relatively dense concentration of population. In such conditions labor was more concentrated, and defense, administration and even the care of souls are easier and cheaper than they would otherwise have been. The climate and flatness of the land meant that windmills could provide power, extending the scope of human industry. Holland's location "at the mouths of three long great Rivers... passing through Rich Countries" connected its concentrated population with markets for manufactures and with agrarian areas that can supply food. Its position on the coast provided access to vast fisheries, and made the country a natural port for foreign and domestic shipping. The Dutch were, literally, natural merchants.[141]

This advantage in situation formed the basis for all further analysis. So, passing from situation to trade, Petty showed that natural mastery of the shipping trade in turn conferred a massive advantage in trade generally.

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[140] Petty, *Political Arithmetick*, 10 (*EW*, 255). Petty's thinking on this question may have been sparked by reading Nicolaas Witsen's *Book of Building Ships*, which he felt was absurdly "cry'd up at Court" and against which he pitched his own skeletal "Treatise of Navall Philosophy".

[141] Petty, *Political Arithmetick*, 11-16 (*EW*, 255-258).

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> Those who predominate in Shipping, and Fishing, have more occasions than others to frequent all parts of the World, and to observe what is wanting or redundant every where, and what each People can do, and what they desire, and consequently to be the Factors, and Carriers for the Whole World of Trade.[142]

"Situation hath given them Shipping, and... Shipping hath given them in effect all other Trade".[143] This effect of trade (itself an effect of situation) also had an important qualitative feedback effect on the population.

> Husbandmen, Seamen, Soldiers, Artizans and Merchants, are the very Pillars of any Common-Wealth; all the other great Professions, do rise out of the infirmities, and miscarriages of these: now the Seaman is three of these four. For every Seaman of industry and ingenuity, is not only a Navigator, but a Merchant, and also a Soldier... wherefore to have the occasion of abounding in Seamen, is a vast conveniency.[144]

Petty's enthusiasm for sailors was rooted in a conception of socio-professional hierarchy probably consciously modeled on an idea of a scalar "great chain of being" in which each species includes all the qualities of lower forms and is included by all the higher forms.[145] The seaman, because of his range of physical and mental capabilities, was, from the point of view of a maritime commonwealth like England or the United Provinces, the preeminent type of person.

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[142] Petty, *Political Arithmetick*, 15 (*EW*, 258).

[143] Petty, *Political Arithmetick*, 20 (*EW*, 261).

[144] Petty, *Political Arithmetick*, 17 (*EW*, 259).

[145] The idea of a hierarchy of trades, the higher of which "comprehend" the lower, is evident in a manuscript dated by Harris, tentatively, to the 1660s, and entitled "How all persons & Things may contribute proporti[onally] to their Government & defence"; BL MS Add. 72865, ff.6-13. Petty later wrote on the cosmic "Scale of Creatures"; see his "Scale of Animalls", in BL MS 72898, ff.106-113 and printed in *Petty Papers*, 2:19-34. There is another copy of the "Scale of Animalls" in Osler MS 7614.

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The complex, trilateral, cause-effect relationship between a natural advantage in shipping, a demographic preponderance of seamen, and success in trade showed the limitations of analyses, like Coke's, that considered policy in the abstract. When Petty did discuss Dutch policy explicitly, he was careful to point out that it was "superstructed upon these natural advantages, and not as some think upon the excess of their [i.e., the Dutch] Understandings."[146] Yet, again, it was also in part the product of more recent Dutch history, and the effect of this history on the habits of the people. Petty noted the impoverished and persecuted state of the Protestant Low Countries in the sixteenth century and argued that

> From hence it necessarily follows, that this People must Labour hard, and set all hands to Work: Rich and Poor, Young and Old, must study the Art of Number, Weight, and Measure; must fare hard, provide for Impotents, and for Orphans...; must punish the Lazy by Labour... I say, by all these particulars, said to be the subtile excogitations of the *Hollanders*, seem to me, but what could not almost have been otherwise.[147]

Even Dutch religious toleration was based on a combination of historical experience and prudent recognition of inescapable natural law. In the first place, there was the specific historical circumstance that "They themselves broke with *Spain*, to avoid the imposition of the Clergy."[148] Secondly, there were (as Weber later argued)[149] economic benefits:

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[146] Petty, *Political Arithmetick*, 21 (*EW*, 261).

[147] Petty, *Political Arithmetick*, 21 (*EW*, 261). This is the passage Bonar has in mind when he argues for the influence of Sir William Temple (see Bonar, *Theories of Population*, 96). Bonar (95) neatly summarizes Petty's view: "What the Dutch do by necessity of situation England might do from choice".

[148] Petty, *Political Arithmetick*, 23 (*EW*, 262).

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> Dissenters of this kind, are for the most part thinking, sober, and patient Men, and such as believe that Labour and Industry is their Duty towards God. (How erroneous soever their Opinions be.)[150]

More fundamentally, the Dutch recognized that conscience cannot be forced: "no Man can believe what [i.e., whatever] himself pleases, and to force Men to say they believe what they do not, is vain, absurd, and without Honor to God." Modestly they knew "themselves not to be an Infallible Church, and that others had the same Scripture" to guide them "and withal the same Interest to save their Souls"; the best course was to trust to that spiritual self-interest.[151] On a more practical level, they had learned from the failures of repressive regimes in France and Spain, where "the Churchmen are about one hundred for one, to what they use or need; the principal care of whom is to preserve Uniformity".[152] This, both for Petty and, according to Petty, for the Dutch, was an expensive waste of resources on an inherently impossible task:

> They believe that if 1/4 of the People were Heterodox, and that if that whole quarter should by Miracle be removed, that within a small time 1/4 of the remainder would again become Heterodox one way or other,

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[149] Max Weber (trans. Talcott Parsons), *The Protestant Ethic and the Spirit of Capitalism* ([1930] London, 2001).

[150] Petty, *Political Arithmetick*, 23 (*EW*, 262). By "Dissenters of this kind" Petty probably means to distinguish Presbyterians from more radical sects, particularly Baptists and Quakers. Like many of his latitudinarian Anglican friends (notably Bishop Wilkins), Petty was at least as wary of the perceived anarchistic tendencies of the sects as of the Romish allegiances of Catholics. In the 1650s, as commissioner of the Down Survey and as a protégé of Henry Cromwell, he had faced political attacks by the more radical religious faction of the Army and Irish administration. His religious thinking is treated at greater length in later chapters.

[151] Petty, *Political Arithmetick*, 24 (*EW*, 262).

[152] Petty, *Political Arithmetick*, 24 (*EW*, 262).

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> it being natural for Men to differ in Opinion in matters above Sense or Reason.[153]

Policy should articulate itself to situation, and restrict itself to matters of sense or reason.

Chapter III of *Political Arithmetick* applied the same situational analysis to England's other perennial rival, France. Where the Dutch, as a mercantile nation, benefited from natural advantages, the French, as a would-be maritime power, suffered from similarly natural constraints. The form of the argument was much the same; the conclusion was the opposite. Naval power required large ships; large ships required good ports and large numbers of skilled sailors. Yet France has "no Ports able to receive large windward Vessels, between *Dunkirk* and *Ushant*", and "As for the wide Ocean, which his Harbours of *Brest*, and *Charente*, do look into", the wide-

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[153] Petty, *Political Arithmetick*, 25 (*EW*, 263). The claim that there is naturally occurring ratio of dissent in "matters above Sense or Reason" is connected to the earlier view of dissenters as industrious. This is only superficially Weberian: in fact Petty sees the relevant feature of dissent (not Dissent) neither in terms of doctrinal content nor in the adaptation of this content to everyday life, but apparently in the simple fact of a particular demographic proportion of heterodox believers in any given population of any given faith. He elaborates his view on pages 25-27 (*EW*, 263-264):

> Moreover it is to be observed that Trade doth not (as some think) best flourish under Popular Governments, but rather that Trade is most vigorously carried on, in every State and Government, by the Heterodox part of the same, and such as profess Opinions different from what are publickly established: (that is to say) in *India* where the *Mahometan* Religion is Authorized, there the *Banians* are the most considerable Merchants. In the *Turkish* Empire the *Jews*, and Christians. At *Venice*, *Naples*, *Leghorn*, *Genoua*, and *Lisbone*, *Jews*, and Non-Papist Merchant-Strangers: but to be short, in that part of *Europe*, where the *Roman* Catholick Religion now hath, or lately hath had Establishment; there three quarters of the whole Trade, is in the hands of such as have separated from the Church... Nor is it to be denied but that in *Ireland*, where the said *Roman* Religion is not Authorized, there the Professors thereof have a great part of the Trade. From whence it follows that Trade is not fixt to any Species of Religion as such; but rather as before hath been said to the Heterodox part of the whole[.]

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open sea gave the enemy such "Latitude of engaging or not" as afforded the French King no advantage.

> Wherefore, although the King of *France* were immensely rich, and could build what ships he pleased... yet if he have not Ports to receive, and shelter [them]... the said Riches will in this case be fruitless, and a mere expense without any return, or profit.[154]

Nor, in consequence of this relative lack of ports and therefore of shipping, could France hope to produce sufficient numbers of able seamen to man large numbers of ships without a disproportionately excessive outlay of resources. France was simply not a natural maritime power in the same way as the United Provinces (or, as Petty argued, England). Be his policy what it would, the King of France was no match for Nature. "[T]he impediments of France (as to this purpose) are natural, and perpetual."[155]

The rest of *Political Arithmetick* dealt with England. Short chapters challenged Coke on taxation (Chapter II), the growth of English trade since before the Civil War, the cost of defense, and the availability of employment, money, and capital stock (Chapters VI-X). But the heart of the book, Chapters IV and V, built on the framework of situation, trade and policy already established. Chapter IV set out to show "That the People and Territories of the King of *England*, are naturally near as

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[154] Petty, *Political Arithmetick*, 53-54 (*EW*, 279).

[155] Petty, *Political Arithmetick*, 54 (*EW*, 280). Petty's conception of natural law was clearly tied to his understanding of natural advantages and impediments. England's claim to sovereignty of the Narrow Seas, for instance, is vindicated by its natural advantages and the natural impediments of rival claimants – Petty, *Political Arithmetick*, 63 (*EW*, 284).

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considerable for Wealth and Strength, as those of *France.*"[156] This could not be a matter of relative size alone; although Petty implausibly argued that the global English population amounted to little less than the French (ten million English subjects in various parts of the world, as against thirteen and a half million French),[157] the real substance of his argument lay elsewhere. More important was that "both Princes have more Land, than they do employ to its utmost use".[158] The natural balance of power lay in the differential not between English and French territory or population, but between English and French ratios of "hands" to "lands".

This point emerged most clearly from a long digression, pitched "rather as a Dream or a Resvery [sic], than a rational Proposition", on the benefits of transplanting all people and property out of Scotland and Ireland and into England.[159] Scotland and Ireland were underpopulated, unproductive and troublesome areas. A concentration of population and wealth in England would lower the cost of government, ease defense, increase the ratio of labor to land and improve both land value and productivity. In fact, the advantage gained by such a move would exceed the costs by a factor of four, and some costs might even be recovered by selling Ireland to "any Prince willing to inlarge his Territories".[160] The greater point of this "*mere Dream*" was that in evaluating the wealth and strength of a state, what mattered was not sheer size but the proportion of population to territory, and the

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[156] Petty, *Political Arithmetick*, 64. (*EW*, 284).

[157] Petty, *Political Arithmetick*, 75 (*EW*, 291). Petty's estimates seriously exaggerated English population and underrated the French.

[158] Petty, *Political Arithmetick*, 65 (*EW*, 285).

[159] Petty, *Political Arithmetick*, 65-74 (*EW*, 285-290).

[160] Petty, *Political Arithmetick*, 72 (*EW*, 289).

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quality of each. In England the labor-land ratio was higher than in France, as was the proportion of the population engaged in useful trades, such as shipping (rather than useless ones, such as monastic living). Petty conceded "that the King and some great Men of *France*, appear more Rich and Splendid, than those of the like Quality in *England*", but claimed that this circumstance "arises rather from the nature of their Government, than from Intrinsick and Natural causes and Wealth and Power".[161] Since French aristocratic splendor was an artifact of wasteful policy rather than an expression of France's true situation, it gave a false picture of strength. In terms of situation, England was naturally as powerful as France.

Conversely, "the Impediments of England's greatness, are but contingent and removable",[162] accidents of misguided policy rather than immutable facts of nature. In Chapter V, Petty recommended a political reorganization of England's territories and populations to make the most of its situation. It could not be helped, certainly, that the various territories under the English Crown "are too far asunder, and divided by the *Sea* into many several *Islands* and Countries".[163] What could be helped was that they are also divided "into so many Kingdoms, and several Governments" and that the governments even of the plantations differed among themselves, "although there be not naturally substantial reasons from the Situation, Trade and Condition of the People, why there should be such differences."[164] These needless political, legal and administrative distinctions created artificial rivalries between territories: "the

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[161] Petty, *Political Arithmetick*, 86 (*EW*, 297).

[162] Petty, *Political Arithmetick*, 87 (*EW*, 298).

[163] Petty, *Political Arithmetick*, 87 (*EW*, 298).

[164] Petty, *Political Arithmetick*, 87-88 (*EW*, 298).

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which instead of uniting together, do often Cross one anothers Interest", most obviously in restricting trade, "and so all the smaller Kingdoms and Dominions, instead of being Additions are really Diminutions".[165] The answer was a unified government for the whole empire, consisting of two "Grand Councils", one appointed by the King and the other elected by the People.[166] Petty handled ancillary problems – taxation, church livings, and the like – are solved in a similar spirit:

> None of these Impediments are Natural, but did arise as the irregularity of Buildings do, by being built, part at one time, and part at another; and by changing of the state of things, from what they were at the respective times, when the Practices we complain of, were first admitted, and perhaps, are but the warpings of time, from the rectitude of the first Institution.[167]

Seen in very general terms, policymaking was the art of making the most of natural advantages. In concrete circumstances, however, it could also be seen as a matter of catching up with, or cleaning up after, history. For England, the history that needed attention was the history of plantation, or colonization, which had given the English Crown authority, piecemeal, over a multiplicity of kingdoms and dominions, and divided one polity into a variety of regional interests. The imperial unification proposed in *Political Arithmetick* may seem to have been motivated by concern for trade. But this is to forget that productivity, trade and even wealth itself were *instrumental* to a more fundamentally political conception of strength – for Petty as

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[165] Petty, *Political Arithmetick*, 87-88 (*EW*, 298).

[166] Representative and appointed councils for the government of the "English Empire" or parts of it were a recurring theme in Petty's work throughout the 1670s and 1680s.

[167] Petty, *Political Arithmetick*, 94 (*EW*, 301).

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for Coke. This preeminently political dimension was largely implicit in *Political Arithmetick*, which had such frequent recourse to polemical jabs at Coke and his opinions on trade. When Petty applied political arithmetic to Ireland, however, politics came to the fore, and cleaning up after history gave way to remaking it.

The political medicine of Ireland

In December of 1672, at around the time he was completing a draft of *Political Arithmetick*, Petty wrote a letter to Arthur Annesley, by then Earl of Anglesey. The two had known each other from the 1650s at least; both had worked on the Irish settlement before and after the Restoration, and Petty seems to have thought of Anglesey as a colleague of sorts as well as a potential political patron. The letter was a friendly one, and Petty took time to acquaint Anglesey with what he was up to. Petty divided his activities into three categories: "Matters of recreation" ("such things as I exercised my self with before the age of 20": probably a combination of mathematical exercises, natural-philosophical thought-experiments, more or less satirical dialogues, and verse), "Businesse" (embracing an array of projects for economic and social improvement – "to rectifie double charge in the Exchequer... To contest with proud Beggars, and... to provide employment for 300 usefull artisans and beggars", perhaps on his own considerable estates in Kerry), and "Mixt":

> The last sort are, Politicall Arithmetick [&] the Politicall Anattommy of Ireland whereupon I thinke depends The Politicall Medicine of that Country, And these things I doe without Interest faction or party, but as I thinke according to the Aeternall Lawes & measures of Truth.[168]

[168] Petty to Anglesey, 17 December 1672, BL MS Add. 72858, f.73. This is usually cited (for instance, in *EW*, 239 n.2) as Petty's earliest use of the phrase. In fact he had used it ten days earlier in a letter to Southwell: "I have a world more of Politicall Arithmethik"; Petty to Southwell, 7 December 1672, BL

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Petty carefully distinguished political arithmetic from the straightforward "business" of state finance or national economic welfare. But though it was a "mixt" endeavour, both intellectual and practical, it had a very specific political problem in mind: the "political medicine" of Ireland.

Political Arithmetick had been designed to impress readers with Petty's analytical abilities, and the book ran rhetorical circles around Roger Coke's clumsily formulaic double treatise. But there was a real tension in the book between a minimalist view of policy that emphasized the ineluctability of situation (as in the chapters on the United Provinces or France), and a suppressed but vital belief – essential to political arithmetic as a political program though not so much to *Political Arithmetick* as an advertisement – in the possibility that the right policy could *change* the situation.[169] Petty's favourite slogan was "Let Nature work." In his commentary on Dutch toleration his meaning seemed clear: laws that contradict nature were always costly failures. Yet situation, as we have seen, was not exclusively natural. It included history, which included past policy. Dutch toleration was conditioned at least in part by the memory of Spanish intolerance.

The composite nature of situation let policy in by the back door – this is why, despite their methodological differences, Petty ultimately concurred with Coke that all England needed was a change of policy. Further, it was essential that it do so. For

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MS Add. 72858, f.58. It is a small point, but the context of the latter use in particular suggests that it was, at least between Petty and Southwell, already a familiar term.

[169] That is to say, present situation constrained present policy choices, but the right choices could change the situation and thus alter the context and constraints operating on policy in the future.

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although in its analytical aspect political arithmetic seemed to discount policy, it was not primarily an analytical tool, but a practical one. By so denigrating the power of traditional policy in his clever critique of Coke's treatises, Petty – as a purveyor of policy proposals – painted himself into a corner from which only a policy instrument of an altogether higher order could extract him.

Political arithmetic – taken as the sum of the various manuscript proposals described in the last chapter – was such an instrument. It was created not to trounce Coke or "mercantilist" opinion on the United Provinces but to fix Ireland's ills by taking a radically new and comprehensive approach to the Irish settlement. Considered this way, Petty's rhetorical skepticism about policy should be seen as a polemical slap at Coke and the Dutch, not a firm position on the role of the state. Even in the course of his apparently minimalist, rationalizing, standardizing program for removing England's impediments in Chapter V of *Political Arithmetick*, Petty lamented

> That *Ireland* being a Conquered Country, and containing not the tenth part as many *Irish* Natives, as there are *English* in both Kingdoms, That natural and firm Union is not made, between the two Peoples, by Transplantations, and proportionable mixture, so as there may be but a tenth part, of the *Irish* in *Ireland*, and the same proportion in *England*; whereby the necessity of maintaining an Army in *Ireland*... may be taken away.[170]

This involved an *extension* of the role of policy beyond Coke's wildest dreams. Union with Ireland was not a simple matter of clearing away legislative underbrush or readjusting administrative structures, though both these things were included in it.

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[170] Petty, *Political Arithmetick*, 92 (*EW*, 300-301).

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Beyond that, it was a union of peoples, effected by an ambitious program of physical transplantation and, eventually, cultural transformation.

> May not the three Kingdoms be United into one, and equally represented in Parliament? Might not the several Species of the Kings Subjects, be equally mixt in their Habitations[?] ... I humbly venture to say, all these things may be done, if it be so thought fit by the Sovereign Power[.][171]

In practice, political arithmetic was a science of "proportionable mixtures" of different populations, a program of demographic manipulation by which policy *could* change the make-up of a population by aping the effects of situation and, in the long run, by becoming part of situation itself. To see this fully, however, one must go beyond the text of *Political Arithmetick.*

Along with the latter manuscript, Petty circulated *The Political Anatomy of Ireland*, written, as the letter to Anglesey suggests, roughly simultaneously.[172] *Political Anatomy* was a comprehensive application to the Irish context of the situational analysis sketched in *Political Arithmetick.* In a different order, but in substantially the same way, *Political Anatomy* examined Ireland's land in terms not just of ownership and overall quantity of arable versus waste (as in Chapter I), but also of soil and climate throughout the country, and the relative value of lands in different counties (Chapters VIII and IX, respectively). It looked not just at the population overall but at its confessional and national divisions, the proportions of it

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[171] Petty, *Political Arithmetick*, 95 (*EW*, 302).

[172] See Chapter 4. Southwell's copy (BL MS Add. 21127) is dated 1672. Like its sister manuscript, *The Political Anatomy of Ireland* [hereafter *Political Anatomy*] was not printed in Petty's lifetime but only posthumously, in 1691.

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devoted to different trades, and the number of "spare hands" needing employment (Chapter II); even more than in his chapter on the Dutch in *Political Arithmetick*, Petty showed an instrumental interest in cultural matters (Chapter XII specifically groups the "Religion, Diet, Cloaths, Language, Manners, and Interest of the several present Inhabitants of *Ireland*" as related and collectively relevant categories of analysis). Ireland's recent history – both since the rebellion of 1641, and the history of its plantation by the English in general – came up in several chapters. Petty itemized Ireland's current administrative, judicial, ecclesiastical, and military structures and the costs of maintaining them and suggested reform along the lines hinted in *Political Arithmetick. Political Anatomy* took up trade chiefly with reference to the artificiality or otherwise of the various "impediments" that blocked it, and evaluated policy in terms of situation.

Its chief proposal was the union of England and Ireland. Here again *Political Anatomy* applied the approach *Political Arithmetick* had outlined, though with anatomy replacing of arithmetic as the metaphorical language of analysis.[173]

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[173] This discrepancy has led some scholars to see political anatomy as a fundamentally different, alternative or even opposed model to political arithmetic: see especially Tony Aspromourgos, "Political Economy, Political Arithmetic and Political Medicine in the Thought of William Petty", in Peter D. Groenewegen (ed.), *Physicians and Political Economy: Six Studies in the Work of the Doctor-Economists* (London, 2001), 10-25. Aspromourgos writes of political arithmetic and political anatomy that "The former takes its inspiration from algebra, the calculus of symbolic forms; the latter obviously takes its bearing from medicine, and more generally, the structure and functioning of animal organisms" (15). But it is not clear that Petty here used either algebra or medicine in any other than an analogical sense, or with the sort of mutual exclusivity implied. Aspromourgos continues (17):

> [I]t seems evident that *if* the algebraic model and the anatomical model were competing in Petty's mind in the 1670s – as to which was the most appropriate inspiration or analogue for a new scheme devoted to socio-economic enquiry – algebra eventually won out. That is not surprising. In the vast collection of manuscripts Petty left behind, there are considerable discussions of method and methodology; and the model of mathematics is overwhelmingly dominant, relative to anatomy.

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Although the imagery was different, its significance, in context, was strictly comparable: advocacy of an empirical approach to practical politics. That *Political Anatomy* was the fullest embodiment of the political medicine of which *Political Arithmetick* also formed a part is further suggested by its reception. The Earl of Essex, then Lord Lieutenant of Ireland, read both works enthusiastically and commissioned from Petty a *Report from the Council of Trade* – in essence, a summary of the former that could function as a key to some of Petty's later proposals.[174] *Political Anatomy* can therefore tell us a great deal about what political arithmetic in general was meant to do, and more especially about how the style of policymaking adumbrated in *Political Arithmetick* related to the specific policies Petty advocated for Ireland.

This is clearest in Chapter V, "Of the future Settlement of *Ireland*, Prorogation of Rebellions, and its Union with *England*." Petty began with a nod to the history of the English endeavour to colonize Ireland.

This transition from different sources of "inspiration or analogue" to mutually exclusive functional paradigms is questionable in the absence of more direct evidence. Further, the claim that an "algebraic model" somehow "won out" in later manuscripts is not supported by Petty's continuing interest in the sort of questions dealt with in *Political Anatomy*, for instance in his prospectus for "The New Instrument of Government" (1682), BL MS Add. 72880, ff.60-71, or in the "Quaeries concerning the nature of the natives of Pensilvania" (1686), BL MS Add. 72867, ff.74-77. Petty described the *Treatise of Ireland* (completed mid-1687 and shown to the King that September, months before Petty's death – see *EW*, 546-547) as "An Essay in Political Arithmetick" that included "The Political Anatomy of that Kingdom" (*EW*, 549); in a paper of "Advantages humbly offered to the King" (c.1687), he proposed "To make Politicall Anatomyes, and keep accompts of his Majesties 3 Kingdomes", BL MS Add. 72866, ff.101-102.

[174] See *EW*, 212. The *Report* was printed along with *Political Anatomy* in 1691 (and reprinted in *EW*, 211-223); there it is dated 24 March 1676. But the copy in the National Archives (SP 9/2/2) is dated 25 March 1673. Harris tentatively dates the draft in BL MS Add. 72879, ff.104-111 to 1675. Neither these nor the copies in BL MS Add. 38849, ff.86-93 (Pepys's copy), BL MS Add. 72852, ff.106-113, and TCD MS 888, ff. 138-143 (in William Molyneux's papers), give conclusive evidence. However based on Petty's assertion that by 1675 the *Report* was "in every great mans archives" (Petty to Wood, 10 April 1675, BL MS Add. 72858, f.211) an earlier date seems probable.

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> The *English* invaded *Ireland* about 500 years since; at which time, if the *Irish* were in number about 1,200,000. *Anno* 1641, they were but 600,000 in number, 200 years ago, and not above 300,000 at the said time of their Invasion; for 300,000 people will, by the ordinary Course of Generation, become 1,200,000 in 500 years; allowance being made for the Extraordinary Effects of Epidemical Diseases, Famines, Wars, *&c.*
>
> There is at this Day no Monument or real Argument that, when the *Irish* were first invaded, they had any Stone-Housing at all, any Money, any Foreign Trade, nor any Learning but the Legend of the Saints, Psalters, Missals, Rituals, *&c. viz* nor Geometry, Astronomy, Anatomy, Architecture, Enginery, Painting, Carving, nor any kind of Manufacture, nor the least use of Navigation, or the Art Military.[175]

Cultural improvement and natural reproduction were linked through the historical process of colonization or plantation. Petty's ideas about this process owed less to the economic writing of the seventeenth century than to the Irish plantation writing of the later sixteenth:

> Sir *John Davys* hath expressed much Wit and Learning, in giving the Causes why *Ireland* was in no measure reduced to *English* Government, till in Queen *Elizabeths* Reign, and since; and withal offers several means, whereby what yet remains to be done, may be still effected.
>
> The Conquest made by the *English*, and described in the Preamble of the Act of Parliament past *Ann.* 1662 for the Settlement of *Ireland*, gave means for any thing that had been reasonable of that kind [but has been diverted].[176]

When Petty then asked the crucial question, "What may be done by natural possibility, if Authority saw it fit?",[177] he was talking about the successful completion of the process of English colonization in Ireland begun five centuries before. This was

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[175] Petty, *Political Anatomy*, 25 (*EW*, 154-155).

[176] Petty, *Political Anatomy*, 25-26 (*EW*, 155).

[177] Petty, *Political Anatomy*, 26 (*EW*, 155).

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the task that political anatomy and political arithmetic ("The Political Medicine of that Country") were meant to accomplish.

Petty's reference to Sir John Davies indicated the origins and drift of his own thinking. Davies's *A Discoverie of the True Causes why Ireland was never entirely Subdued* (1612) was one of the major early seventeenth-century texts on Irish plantation. It put forward a sustained argument for concerted and comprehensive state action, at a time when the project of colonization was a tangled and bloody mess of private interests that had boiled over several times into war.[178] Davies approached the problems of colonization in a way at least superficially congenial to Petty: he paid close attention to the constraints of situation and to matters of culture, while arguing that many "impediments" were in fact owing to "the defects of the Civil Pollicy and Government" of English governments and their representatives, and might be rectified.[179] In particular he stressed the need for "an universall and absolute conquest of all the *Irishrie*",[180] and a civil and moral reformation of the English colonies already in place. This could only happen if English laws and the protection of the English Crown were extended over the whole of Ireland, and the autocratic aspirations of undisciplined private planters squelched. Centralized government – and

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[178] Davies, *A Discoverie of the True Causes why Ireland was never entirely Subdued, nor brought under Obedience of the Crowne of England, until the Beginning of his Majesties happie Raigne* ([1612] Shannon, 1969).

[179] Looking back on centuries of failed policy, Davies remarked that "in euery age there were found such impediments... as caused almost an impossibility, that thinges should haue bin otherwise than they were": Davies, *Discoverie of the True Causes*, 4.

[180] Davies, *Discoverie of the True Causes*, 5-6.

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a unified sovereign, it is worth noting[181] – was the essential basis not only of political stability but of the maintenance of cultural identity and hence any possibility of civilization:

> The *Defects* which hindred the *Persecution* [sic] of the Conquest of *Ireland*, were of two kinds, and consisted; first, *in the faint prosecution of the warre*, and next, *in the loosenesse of the civill Gouernment*. For, the Husbandman must first breake the Land, before it bee made capeable of good seede: and when it is thoroughly broken and manured, if he do not forthwith cast good seed into it, it will grow wilde againe, and beare nothing but Weeds. So a barbarous Country must be first broken by a warre, before it will be capeable of good Gouernment; and when it is fully subdued and conquered, if it bee not well planted and gouerned after the Conquest, it wil eft-soones return to the former Barbarisme.[182]

If English law had simply been extended beyond the limited pale of English settlement to the Irish in general, however,

> there had been a perfect Union betwixt the Nations, and consequently, a perfect Conquest of *Ireland*. For the Conquest is never perfect, till the war be at an end; and the war is not at an end till there be peace and unity; and there can never be unity & Concord in any one Kingdom, but where there is but one King, one Allegiance, and one Law.[183]

Davies's point was sharpened not only by the destructive antics of Protestant planters but also by the perceived "degeneration" of the Old English, the Catholic descendants of the Anglo-Norman and subsequent pre-Reformation planters, who were now

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[181] Davies seems to have been influenced by Bodin, but explicitly disagrees with him over the status of tributary rulers, arguing that they are "not properlie *Subiects* but *Soueraignes*" – and that English reliance on Irish tribute has perpetuated the troublesome division of sovereignty in the island. Ibid., 14. Petty probably read Bodin and certainly read Hobbes.

[182] Davies, *Discoverie of the True Causes*, 4-5.

[183] Davies, *Discoverie of the True Causes*, 121.

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culturally (in "Language, Names, Apparell, and all their maner of living", laws, marriages, "nurture of infants", and personal allegiances)[184] indistinguishable from the original Irish. Degeneration and civilization were doubly related to the absence of a single authoritative legal structure: following Spenser, Davies thought law essential to the maintenance of cultural identity; he also, perhaps uniquely, saw that without the benefits of protection under the English law that subject status conferred, the Irish had little reason to "go English".[185] Only where English laws and institutions prevailed could the civilized few lead the barbarous many.[186]

To Davies, writing several years after the "Flight of the Earls" in 1607,[187] it had seemed that a conquest had at last been made and a constitution settled. Events, at length, proved him wrong. The Ulster rebellion of 1641 spread throughout the

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[184] Davies, *Discoverie of the True Causes*, 212-213.

[185] Davies, *Discoverie of the True Causes*, 116-118.

[186] Davies's analysis here follows Edmund Spenser's – see Spenser (ed. Renwick), *A View of the Present State of Ireland* ([1596] London, 1934), 196-197:

> [W]here there is noe good staye of gouerment and stronge Ordynances to hold them there indeed, the fewer will followe the more But where there is due order of decyplyne and good rule, there the better shall goe formost, and the worse shall followe, And therefore, since Ireland is full of her owne nation, that maye not be rooted out and somewhat stored with englishe alreadye and more to be I thincke yt best by an vnion of manners and conformitie of myndes, to bringe them to bee one people, and to putt awaye the dislikefull concepte but of the one and the other, which wilbe by no meanes better then by this entermingelinge of them, that neyther all the Irishe maye dwell together, nor all the Englishe, but by translatinge of them, and scattringe them in small numbers, amongst the Englishe, not onelye to bring them by dalye conversation vnto better lykinge of each other, but also to make both of them lesse able to hurte.

I know of no direct evidence that Petty read Spenser, though it is extremely probable; the *View* was in print from 1633 and widely read. Whether Petty read it or not, he would have encountered many of Spenser's ideas in Davies's work.

[187] In September 1607 the Earls of Tyrone, Tyrconnell and Maguire, implicated in Irish risings and fearing a crackdown by James I, fled Ireland. This left Irish resistance to English plantation without leadership, particularly in the north, and spurred on a new wave of Protestant plantation. See Nicholas Canny, *Making Ireland British, 1580-1650* (Oxford, 2001), 184.

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country and resulted in most of Ireland being governed for a decade by an independent Catholic Confederacy involving Gaelic Irish and Old English alike, before Cromwell's army bloodily reestablished English rule. The memory of rebellion and the threat of degeneration were no doubt prominent in Petty's mind – his own survey, undertaken under Cromwell, formed the working basis for all subsequent acts of settlement. And as his reference to the 1662 Act of Settlement indicates, Petty thought his position not wholly unlike Davies's. A violent rebellion had been conclusively put down, and a settlement was still getting under way.

Yet while Davies could write in 1612 that "the clock of the civil Government, is now well set, and all the wheeles thereof doe move in Order",[188] at the time Petty wrote the settlement promised in 1662 had become hopelessly bogged down by the rival claims of private interests – the displaced Catholic proprietors high and low, Cromwellian and Royalist soldiers, London adventurers and miscellaneous grantees who all claimed much of the same Irish land under different provisions of successive acts of settlement passed then and since. This confusion threatened the interests of the state, which alone could impose an authoritative settlement but seemingly lacked the will to follow it through. Meanwhile, time was passing and the threat of renewed instability grew daily.

Like Davies and Spenser before him, and in opposition to many of his contemporaries, Petty still preferred a union of nations to wholesale removal (or extermination) of the Irish by the English. He made this case in Chapter V of *Political Anatomy*. Against those "furious Spirits" who "have wished, that the *Irish* would

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[188] Davies, *A Discoverie of the True Causes*, 284.

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rebel again, that they might be put to the Sword", he argued that "the *Irish* will not easily rebel again" – if only, he sarcastically noted, "from the memory of their former Successes, especially of the last".[189] More concretely, the redistribution of property – in part resulting from the settlement – and the consequent imbalance of forces made rebellion unlikely:

> [T]he British Protestants and Church have 3/4 of all the Lands; 5/6 of all the Housing; 9/10 of all the Housing in wall'd Towns, and Places of srength[;] 2/3 of the Foreign Trade. ...6 of 8 of all the *Irish* live in a brutish nasty Condition, as in Cabins, with neither Chimney, Door, Stairs nor Window; feed chiefly upon Milk and Potatoes, whereby their Spirits are not dispos'd for War. And... although there be in *Ireland* 8 *Papists* for 3 others; yet there are far more Soldiers, and Soldierlike-Men of this latter and lesser Number, than of the former.[190]

Further, as Petty had argued since the 1650s, removal was undesirable from the English perspective, since the Irish, as the only labor force of any size, were essential to English plantation itself. This was just the sort of argument that *Political Arithmetick* might lead us to expect, and it tallied with Petty's own position as the landlord of a sparsely populated Kerry estate. It was in fact a more purposive restatement of much of the information in the other chapters of *Political Anatomy* itself – specifically, of the relative proportions of Catholic and Protestant land and property ownership detailed in Chapter I; the ratio of Catholic to Protestant and, coextensively, Irish to "British" (English and Scottish) populations, and their respective military capacity, given in Chapter II; and, most impressively, of the effects of diet and living conditions examined in Chapter XII. Petty went on to give

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[189] Petty, *Political Anatomy*, 26 (*EW*, 155).

[190] Petty, *Political Anatomy*, 27 (*EW*, 156).

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further evidence of the security of the Protestant population, the King's ability to maintain it (relying on Chapter VII), and the unlikelihood of foreign aid for another rebellion.[191]

Having ruled out extirpation, Petty presented his alternative: "the transmuting one People into the other, and the thorough union of Interests upon natural and lasting Principles".[192] The way Petty envisioned this transmutation reveals the extent of his departure from Davies, Spenser and the tradition of plantation writing. Where Davies saw the mere extension of English law and the centralization of English administration as the keys to effecting a union of nations, Petty saw the process in primarily cultural and demographic terms.[193] Transmutation was directed to attaining that "proportionable mixture" of people mentioned in *Political Arithmetick*, a mixture accomplished chiefly by transplantation. Echoing his "Resvery" in the latter book, Petty insisted that "*Henry* the II. could have brought over all the people of *Ireland* into *England*" – "declining the benefit of their Land", this would have "fortified, beautified and enrich'd *England*, and done real kindness to the *Irish*."[194] Since the population had quadrupled in the intervening period, "the same work is near four

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[191] Petty, *Political Anatomy*, 27-29 (*EW*, 156-157).

[192] Petty, *Political Anatomy*, 29 (*EW*, 157).

[193] This divergence would only increase with Petty's further development of political arithmetic until, in a 1686/7 letter to Southwell, Petty wrote: "I do not envy what Sir John Davis hath said of the politiques of Ireland.... Hee was indeed an excellent Person, but bescribled with Law and Learning. Hee made excellent Patches, but set them beside the hole." Petty to Southwell, 5 March 1686/7; *Correspondence*, 260.

[194] Petty, *Political Anatomy*, 29 (*EW*, 157).

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times as hard now to be done as then".[195] But it would still be worth doing, if there were the political will.

Failing that, Petty suggested a compromise. Considering the relative proportions of "British" to "Papists"[196] (300,000 to 800,000) and the abject poverty of 600,000 of the latter, a population "Exchange... of but about 200,000 Irish, and the like number of British", i.e., out of England or Scotland would render "the natural strength of the British would be equal to that of the Irish". That is, there would be 500,000 of the former and 600,000 of the latter. (Petty's numbers seem to have slipped, but the point is clear enough.) More impressively in the short term, the "Political and Artificial strength" of the British in Ireland would be "three times as great", owing to their dominance in property, arms and, broader cultural factors – "and so visible, that the Irish would never stir upon a National or Religious Account" against the British Protestant interest.[197]

Short-term security, however, was the least of political arithmetic's promises. A further exchange, this time specifically of women, promised the consolidation not only of British power but also, far more significantly, of a transformative cultural hegemony:

> There are among the 600,000 above-mentioned of the poor *Irish*, not above 20,000 of unmarried marriageable Women; nor would above two thousand *per Ann.* grow and become such. Wherefore if 1/2 the said Women were in one year, and 1/2 the next transported into *England*, and disposed of one to each Parish, and as many *English*

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[195] Petty, *Political Anatomy*, 29 (*EW*, 157).

[196] At this point confessional and national/political distinctions appear to have been interchangeable.

[197] Petty, *Political Anatomy*, 29-30 (*EW*, 157-158).

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> brought back and married to the *Irish*, as would improve their Dwelling but to an House and Garden of 3l. value, the whole Work of natural Transmutation and Union would in 4 or 5 years be accomplished.[198]

This, not the rule of physical or legal force, was what transmutation was really about. Petty linked political anatomy and arithmetic to a tradition of thinking about plantation that stressed its improving, civilizing effects, not to say duties. If much of Petty's language and a good deal of his demographic thinking had affinities with, or roots in, the work of economic writers like Child and Coke, nevertheless its original point as a distinct intellectual and political enterprise appears to have been colonial.

It was also what scholars would now call biopolitical. In this sense, Petty's transmutation was not exactly what Spenser and Davies had had in mind. Like their notion of civilization it had a cultural dimension. But it was *not* religious in a missionary sense, as theirs was. Petty was happy to allow the Irish at least a minimal number of Catholic priests. (He did not rule out voluntary conversion as a means of transmutation, but was more concerned with the circumstances that would make such conversion likely than with the proselytizing effort itself.) What mattered was that the priests, Catholic or Protestant, be *English*: given this, toleration and perhaps even Catholicism itself could be an Anglicizing force. This was so because the fundamental problem was not Irish barbarity but Irish disaffection. The Irish did not have to be civilized in any absolute sense; they had to be reconciled to the authority of the English, their interests mingled with those of their political masters. This mingling could not be forced, but if the right conditions were created (some of them

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[198] Petty, *Political Anatomy*, 30 (*EW*, 158).

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requiring force, to be sure) it would eventually supervene. And it would do so *naturally*. A policy which effectively altered situation once would remove the need for further intervention.

A carefully proportioned mixture of English and Irish men and women would transmute the Irish polity by working not through courts, Parliaments or other artificial institutions but through the most elemental structure of society:

> [W]hen the Priests, who govern the Conscience, and the Women, who influence the other powerful Appetites, shall be *English*, both of whom being in the Bosom of the Men, it must be, that no massacring of the *English*, as heretofore, can happen again. Moreover, when the Language of the Children shall be *English*, and the whole Oeconomy of the Family *English*, viz. Diet, Apparel, &c. the Transmutation will be very easy and quick.[199]

Spenser and Davies had spoken of Anglo-Irish union, of the civilization of the Irish and of their "translation" into English. By this they had meant raising the Irish to the English level by enforcing English civility from without – typically by the power of example. Petty's innovation was twofold: to redefine the process of civilizing the Irish in more neutral terms, as the reconciliation of disparate interests, and to locate the process by which this reconciliation might come about in the "oeconomy of the family". This "oeconomy" was the real locus of transmutative political arithmetic.

Political arithmetic in manuscript: transplantation and transmutation

We have now arrived not at the end of an investigation of political arithmetic, but at the proper starting point. Political arithmetic was a program, in the sense that it

[199] Petty, *Political Anatomy*, 31 (*EW*, 158-159).

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applied to one set of related problems a coherent approach that was ultimately amenable to generalization. But it was not a program comprehensively embodied in any one text, not even in *Political Anatomy* and certainly not in *Political Arithmetick.* It manifested itself in shorter and more numerous tracts, in sets of heads, in lists, even in dialogues. In the remainder of this chapter I would like to use the manuscripts to begin to answer the question of where this program came from and what it looked like by seeing what some of its ingredients were and how they came together. At first, these drew on themes common to much writing on economic and social improvement. But gradually, in dialogue with an older tradition of writing on Ireland, Petty's ideas took on a distinct shape all their own. Only in the next chapter will the full significance of this new shape become clear.

In September 1671, Petty submitted a series of proposals to the Earl of Arlington that foreshadowed much that was to come. In particular, he suggested

> That an exact accompt ought to bee taken of the whole people by there number, age, sex, trade, Office, place of habitation, and by all other there circumstances & qualifications, whereby they improve or impaire the publique wealth[.]

This information would form the basis for an economic anatomy of the population that anticipates the sort of demographic hierarchy of professions on which much of the analysis in *Political Arithmetick* would later be based:

> I conceive it expedient, and am ready to offer the proportions which any one person beareth to an other in value; according to his age, trade, office, tythe, Religion or any other qualification, making the Value of [a] full grown Simple Labourer to be the Basis & Radix of all computations[.][200]

[200] BL MS Add. 72865, f.24.

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Petty had long advocated a "Registry of Land, commodities & Inhabitants"[201] – in the 1660s for economic reasons and, going back to his Hartlib circle days, as a tool for social improvement schemes. Here, too, the aim was primarily fiscal, to enable the King "to levy with ease certainty & equality, what the reason of his affaires requires".[202] But there were hints that other applications were around the corner. Describing "The several advantages of these accompts", Petty himself extended their use beyond mere "Equall assessement" and "Knowing the Wealth & Power of the whole Kingdome" to "The advantages & disadvantages of foraign plantations."[203] Manuscript "Observations" on "the power and wealth" of England, France, and the United Provinces, dated c.1671 (possibly notes used in writing *Political Arithmetic*) listed "Colonyes in India", "America", "New England" and the "East Indies" as objects of interest.[204]

It was no giant leap from economic observations to the problems of government, in Ireland or in colonies further afield, and another manuscript, undated but likely from early 1672,[205] made the jump. It grouped together sets of proposals

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[201] See, e.g., BL MS Add. 72878, ff.36-44; printed in *Petty Papers*, 1:77-90.

[202] BL MS Add. 72865, f.26.

[203] BL MS Add. 72865, f.28.

[204] "Severall Observations Beeing an Estimate & Briefe View of the Power and Wealth of the Kingdomes of England, France and the States of the Seven United Provinces Compared with Each Other", BL MS Add. 72865, ff.29-49. Parts of ff.42-49 are printed in *Petty Papers*, 2:226-239.

[205] BL MS Add. 72865, ff.140-142. Harris dates this tentatively to the 1670s based on the hand. The manuscript refers to "war with Holland (their present Rivall)", suggesting that it was written during or shortly before the Third Anglo-Dutch War. Based on this, on its affinities with Petty's proposals of 1671, and its differences with *Political Arithmetick*, I suggest early 1672 as the date of composition.

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"For the People", "For the King", "For the Citty of London", and "For the State", that recapitulate many of the aims announced in the previous manuscript. But it includes a fifth category, "To Transmute the Irish into English", that was new. One of the means apparently proposed to bring about this transmutation, which was to take nine years, did indeed involve

> a Particular yearly Accompt of Every Field, Howse & Man of 8 yeares old within his Majesty's Dominions as also of the Growth of Cattle Corne & Wooll with the state of Inland Emprovements & forraigne Trade.[206]

This paper therefore looks like a stopping-point between the economic anatomy of the 1671 manuscript above and the proposals for transplanting population that Petty would advocate in *Political Arithmetick* and, more explicitly, in the manuscript of *Political Anatomy* that circulated around 1673. It included plans "to reforme the Wretched Howsing" of the Irish, but not yet any scheme of transplantation.[207]

At the same time Petty turned from the economic to the broader political applications of quantitative and qualitative "anatomies", he developed an almost sociological analysis of Ireland's specific political situation. In a manuscript of c.1672, entitled "A Method of Preventing Rebellion, and Intestine warrs in Ireland" Petty examined the various divisions affecting Irish society and destabilizing Irish politics. He began by separating out the different interests absorbed within the Catholic population of Ireland:

Most of the proposals, including that "to Transmute the Irish into English in 9 yeares", recur in "A generall Proposall for England & Ireland" (n.d.), BL MS Add. 72865, ff.143-144.

[206] BL MS Add. 72865, f.141.

[207] BL MS Add. 72865, f.141.

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> 1. There are the old Irish, distinguished from others, by the preposition, Mac: & Ô: who bear a great respect and devotion, to the heads of their respective septs, nor are they well pleased, that even the oldest, and most degenerate English... should have any land amongst them.
> 2. The next sort are the said Old and degenerate English; who are Irish and Papist, and have little Interest Kindred and Acquaintance in England.
> 3. Such of both the last mentioned sorts, as have had their breeding in Foreigne parts, as Church-Men, Souldiers, Courtiers, or Merchants, especially such as were abroad with his Majestie during the late troubles; whereunto may be added the Lawyers of the Popish Religion, Clerkes, & the inferior Officers, and Ministers of the Government....
> 4. Such of the Irish as can speake no English.
> 5. Such Irish as were possest of Estates Anno 1641, & are not restor'd unto them.
> 6. Such are all Church-Men, whom I look upon as discontented for having been outed of their Church-Lands, & Livings....

He then turned to the "varying sorts of English" in Ireland: roughly, Old English Catholics, the descendants of "Old Protestant" planters of Elizabethan and Jacobean times, "New Protestants" of the Civil War and Interregnum, and those who had come over since the Restoration.

These categories were not, taken in the abstract, all of one kind; it was only relative to the "The Severall Quarrells & heartburnings now in Ireland" that they related to each other as rival interests.[208] Most of these "heartburnings" centered on the land settlement: disputes between Irish rebels, royalists and clergy who have had their estates confiscated and those who now enjoyed them; between "Old Protestants" who suffered through the years of the rebellion and the "adventurers" and soldiers who benefited most from the settlement; between different factions of soldiers and adventurers themselves; between royalists and Cromwellians. But purely religious

[208] BL MS Add. 72879, ff.36-37.

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divisions played their part as well. "There are 5 or 6 sorts of Religionaries in Ireland," Petty wrote, "whereof some of every sort, cannot brook liberty of Conscience, and do think it Sinn, not to endeavour the destruction of each other."

> Generally the poor, the proud, Cholerick and Zealous people would be at warrs... and men who are little or nothing of themselves, do endeavour to embody, & make themselves greater, by faction and confederacies[.][209]

In early 1672, it seems, Petty was just beginning to toy with the idea of transmuting the Irish into English. This did not yet mean manipulating the demographic proportions of different social groups; instead, he dwelt on political union[210] and material improvement of the conditions of life, especially housing. But once he had begun, at least implicitly, to treat the very existence of these separate groups as the fundamental problem of Irish politics, it would not be long before his thoughts turned – as they did in *Political Arithmetick* and *Political Anatomy* – to eliminating the divisions themselves in a more radical way.

In 1673 and 1674, Petty began to articulate a comprehensive program of transmutation that included the transplantation and intermarriage of certain segments of English and Irish populations, as well as the political and economic union of the English and Irish states. Further, Petty was now making his opinions known to those in power, both in *Political Arithmetick* and *Political Anatomy* and in a variety of other manuscripts written at the same time. A manuscript written c.1674, for example,

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[209] BL MS Add. 72879, ff.36-37.

[210] For instance, in "An Expedient in Order to an Union of England, Ireland & Scotland" (1672), BL MS Add. 72879, ff.34-35.

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listed questions and proposals addressed to a number of members of the Irish Privy Council – including the Earl of Orrery, Sir George Carteret and Sir Henry Ford. Ford had helped to circulate *Political Arithmetick* in Ireland; Petty would have known Orrery, a hard-line Protestant and a major figure in Irish politics, from the days of the Survey, and as the brother of Petty's celebrated colleague Robert Boyle; Petty's friend Pepys had been Carteret's protégé. Along with the by now familiar range of questions about population and wealth and the usual proposals for union, Petty here proposed, as well as exchanging women "annually", "To translate the Bible & Liturgy into Irish", "To encourage Converts", and "To obliterate [Irish] Names of Persons & Lands".[211] While it did not employ the language of transmutation explicitly, the paper plainly attempted to deal with politically disruptive cultural and religious attachments. In the case of Bible translation and conversion this intent was obvious. To understand why Irish family and place names should be "obliterated" one must remember, as Petty pointed out in the manuscript quoted above, that the Old Irish were differentiated primarily by their names and sept (kinship) loyalties. Anglicizing names would help eliminate these distinctions on a superficial level.[212]

Anglicizing the whole "oeconomy of the family" would do the same thing more profoundly. As a March 1673/4 paper "About Exchanging of Women" put it,

> If 7000 English poore Women were yearly brought out of England to Marry the like Number of poorer Irish Men then in 20 Yeares The Mother or Mistress of every of the said familys would bee an English

[211] BL MS Add. 72879, ff.64-65v.

[212] Petty, interestingly, does not seem to have seen any tension between his proposals for Anglicizing Ireland's social geography and Gaelicizing the English Bible and Book of Common Prayer; both in some sense fostered cultural convergence.

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> protestant woman, and Consequently The Manners, Language & perhaps the Religion of all the sayd familys would bee English.[213]

In a fragment written sometime in the 1670s Petty elaborated a little on the propriety and legality of such a seemingly draconian policy, justifying it in terms of "political medicine": "All government is a sort [of] Physick & chirurgery Unpleasant & painfull enough", no doubt. "[B]ut when tis administered by licensed & authenticq persons, even death must bee borne with." In the context of Ireland, intermarriage for transmutation was comparable to impressment. "The King has power to Imprest [sic] men to serve in War. Methinks hee may doe the same to prevent war." Further, "the qualitys of Exchangd women [were] to bee alike" – that is, all of them were to be poor – and "People who have no visible livelihood may bee disposd of [by] the magistrate."[214] Transmutation was no more or less legal than impressment or the poor laws, and enjoyed the same political sanction.

By 1675, the complex assemblage of policies that made up transmutative political arithmetic could be reeled off by rote. A typical set of heads on union, entitled "Decrees and Judgments of one Island Executed in the Other", ran: "1.United under One Legislature. 2. Cabbins Reformed. 3. Names of Lands & people Changed. 4. 10,000 young Women per annum exchanged", and so on, up to "7. Schools of English Writing & Arithmetic Instituted."[215] A set of "Proposals about the Revenue,

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[213] BL MS Add. 72879, f.71.

[214] "Of Counter-Transplanting the Irish & English", BL MS Add. 72879, ff.117-118.

[215] BL MS Add. 72879, f.75.

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Expence, [&] future Estate of Ireland",[216] dated August 1675, lists "severall things to bee done for the advantage of Ireland out of the revenue of the same", including

> 4. That the Bible and common Prayer-book, bee translated into Irish, & printed in the Vulgar Character, & that fit persons bee salariated, to preach, Catechise & officiate in Irish, in every part of that kingdome weekly.
> 5. That all the Smoaky-lesse Cabbins [i.e. houses with no fixed hearth] of Ireland, bee made houses worth 4£ each, & fitt for the making of Merchantable Butter, cheese & Linnen yarne in them....
> 6. That as many English women bee yearly brought over, as there are Marriages yearly made by the Inhabitants of the said Cabbins, & as many young Irish women sent into England, for Breeding in English manners & huswifery.[217]

The main points – transmutation by a combination of transplantation, intermarriage, and more traditional schemes of material social improvement – were by this time largely settled. Different sets of proposals occurred in different combinations, the numbers of those to be transported or exchanged fluctuated, and the population estimates grew, but from now on Petty's program took on a more routine feel. It is perhaps no coincidence that Petty seems to have begun thinking around this time of applications beyond Ireland. There is, for instance, a series of notes on New England's land, population and government that may approximate to a very rough

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[216] BL MS Add. 72879, ff.84-97, consists of five versions of the same set of proposals: the original, in Petty's hand (ff.84-87v), three copies by amanuenses (ff.88-89 ["A"], ff.90-91 ["B"], and ff.92-93 ["C"]), and a nineteenth-century transcription (ff.94-97, "D") based on "B". Copy "B", which I use, incorporates many of the corrections made on the other copies and seems to be the final version. This degree of polishing, rare in Petty, strongly suggests that the manuscript was meant for circulation among potential patrons.

[217] BL MS Add. 72879, f.90.

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sketch of the colonies' political anatomy.[218] Within a decade, Petty would develop much more comprehensive sets of queries for Pennsylvania, and would become involved in a plantation scheme there.[219]

Conclusion

Petty's political arithmetic aimed at the transmutation of Ireland. To say this is not to deny the economic implications and intent of many of the proposals – part of the point of transmuting Ireland was to make it a source, rather than a sinkhole, of revenue. But to admit the economic dimension should not blind us to the social and cultural aspects of transmutation or to its overarching politics. When Petty proposes to make Irish houses suitable for the production of butter and linen, is that an economic proposal? Yes and no. In an obvious sense, it is: it is about the production of a commodity. But is that all there is to it? Elizabethan and Jacobean writing on Ireland stressed the barbarous living conditions of Irish peasants. Many of the most vivid passages dwelt in particular on rancid butter and filthy linen,[220] and in general (something Petty explicitly set out to correct) Irish women's lack of skill in housewifery.[221] In other words, the economy Petty worried about was the "oeconomy

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[218] BL MS Add. 72867, ff.47-61; ff.47-57 are printed in *Petty Papers*, 2:98-107. Harris tentatively dates these to 1675.

[219] BL MS Add. 72867, ff.62-89; some of these papers are printed in *Petty Papers*, 2:107-121. Individual titles and dates are given in the bibliography.

[220] See in general Fynes Moryson (ed. Graham Kew), *The Irish Sections of Fynes Moryson's Unpublished* Itinerary (Dublin, 1998), 101-114; for butter ("more loathsome then toothsome") and linen in particular see Barnabe Rich, *A New Description of Ireland: Wherein is described the disposition of the Irish whereunto they are inclined* (London, 1610), 25-26; James Perrott (ed. Wood), *The Chronicle of Ireland, 1584-1608* ([1619] Dublin, 1933), 16.

[221] Housewifery was crucial to civility – the former not only symbolized but also, to a great extent, embodied the latter. Commentators on Irish incivility, conversely, dwelt first and foremost on the state

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of the family."[222] These proposals were incidentally about producing commodities but fundamentally about producing civilization. This meant economic as well as social change – a transmutation of the landscape, but also, crucially, of the types of people that fill it.

In the smaller manuscripts, and in *Political Arithmetic* and *Political Anatomy*, things are not always as straightforward as they seem. In the paper just quoted, Petty proposed

> That at the end of the said 9 yeares, a grand accompt bee made up, of all the Lands in Ireland, vizt of their quantity figure situation, Quality, values, Names (ancient & modern)[,] theire Emprovements. Of the Howseing their dimensions, values, of mills, kilns, forges, Ironworkes, fisheryes, mines, Quarryes, & colleryes, Of the cattle, corne, wooll, hemp, flax, & Timber-ware produced in Ireland. Of the People their names, sex, Ages, Births, Titles, Offices, Trades, Religion &c. Of the Balance of Trade between Ireland & all and every other Country & Estate with the Shipping belonging to each Port.[223]

The measures of success, as seen here, were both demographic and economic. But wealth was an instrument of power, not an end in itself. In "A Proposall for Ireland", written around the same time (it is dated 30 August 1675), Petty elaborated on many of the same proposals. Here he said that the absence of preaching "in an intelligible language" (to the Irish) is a "Scandall to Religion and Civility". It turned out,

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of Irish homes, diet and bodies: the domain of mothers and wives. See, e.g., Rich, *A New Description of Ireland*, 24-29.

[222] The word "oeconomy" in this period still connoted the management of household resources: in early modern England one of the characteristic tasks of the housewife, something to which Petty's expression draws particular attention. "Oeconomy" might by analogy describe the management of resources in contexts larger than the individual household, but it did not yet mean anything like "the economy" (the sphere of distinctively economic relations between, e.g., commodity production, distribution, and consumption) as we understand it today.

[223] BL MS Add. 72879, f.91.

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similarly, that "the Wretched Nature" of Irish housing was significant not only for its relation to Irish poverty, but also as

> a powerful meanes of hindring the Reall Union of the English and Irish into One people & of continuing the seeds of Rebellion, & Intestine commotions in the Country[.][224]

Petty's 1675 "Dialogue on Political Arithmetic" is even clearer.[225] Two interlocutors, "A" and "B" ("polishing", as Petty was the first to admit, "is not my way")[226] discuss "a manuscript", presumably *Political Arithmetick*, that, says B, "contaynes the plainest politics I ever yet heard of."

> A: Politics can never bee plaine, you see Geometry which considers the most simple question[s] is extremely difficult. The Science of Motions more, The fabrick of animals yet more, The Minds of Men yet more, But the Genius of Multitude, Which I take to be Politiques, most of all[.] What do you Meane by Politiques[?]
> B: Truth, I meane by Politiques not a quarter of all this, but the way how to keep a people in Peace and plenty, that is able to resist... ambitious Conquerors, & the chagrin of discontented persons at home and to [prevent?] the land from bearing any Unusefull herb [&] to make the best of all it produces.[227]

Political arithmetic was a practical politics based on making the most of situation and dealing with "the chagrin of discontented persons". Even the apparent "Scandall to Religion" mentioned above was first and foremost a political issue, "because Popery seemes to mee not a Matter of Religion but of politics"[228] – a

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[224] BL MS Add. 72879, f.99.

[225] BL MS Add. 72865, ff.93-107.

[226] Petty to Robert Wood, 10 April 1675, BL MS Add. 72858, f.211.

[227] BL MS Add. 72865, f.94.

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question of political supremacy: "The Bishop of Rome? Or all the people of England Scotland & Ireland represented in their King & his Peeres, as also in 500 nay 900 Eminent gentlemen chosen by themselves[?]"[229]

In the early 1670s such questions were not academic. Charles II's perceived Catholic sympathies were as much of a threat in a head of state as in a head of the Church, and his French policy suggested that the Pope was not the only foreigner with undue influence over English government. The internal threat posed by "discontented persons" was even greater. Ireland, in particular, was swarming with them. Their representatives at court were even now trying to roll back the provisions of the Acts of Settlement, on which English Protestant dominance in post-Confederate Ireland was grounded. Transmutation – improvement, transplantation, intermarriage – would all serve to make the Irish more like the English. Removing social divisions removed opposing interests. An Irish man with an English house, wife, and children, who perhaps depended on English markets for his produce (and, as Davies would have added, English courts for his justice), could not well resent the English or usefully oppose their interests. Nor they his – for transmutation could be construed either as a conversion of the Irish to English ways or as a union of both that altered both.

Political arithmetic shared many of the assumptions of contemporary economic writing, especially on the centrality of population to national wealth and strength, and in part it was a development of what it may be legitimate to call Petty's

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[228] BL MS Add. 72865, f.104.

[229] BL MS Add. 72865, f.104.

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economic thought. In its specific aims and much of its content, however, political arithmetic was the lineal descendant of English plantation writing of the late Elizabethan and early Jacobean era. Petty's multifaceted program of "transmutation" drew on the proposals of social reformers like Hartlib, which themselves existed in a broader context of what we would call economic ideas. But it had more in common with the Spenserian idea of "translating" people themselves than with any improvement scheme, not only because it aimed at changing people but also, and no less importantly, because like Spenser Petty was motivated by problems specific to the English plantation of Ireland.

Yet political arithmetic was not merely Spenser updated. In combining elements of both Stuart economic and Elizabethan plantation writing, it altered both, importing conceptual vocabularies from medicine, mathematics, the new naturall philosophy and, most strikingly, alchemy. Petty's own intellectual and political circumstances, reflecting his medical, mathematical and philosophical background as well as his Anglo-Irish career, crucially shaped his contribution. In particular, he was able to conceive of population as at once a quantitative and a qualitative object, manipulable by state policies modeled on the operations of geography and history but reconceived and described in alchemical terms. How he did this – how transmutation was supposed to work on populations, in theory and in practice – is the subject of the next chapter.

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3: The Alchemical Origins of Political Arithmetic

The inspiration and aspirations of transmutative political arithmetic connected Petty to the tradition of English writing about Irish plantation. The language Petty used to describe the project, however, was distinctive. Neither Sir John Davies nor Edmund Spenser, nor contemporaries of Petty's, like Gerard and Arnold Boate, nor even Petty's alchemically-inclined rival Benjamin Worsley, spoke of Ireland's problems or the solution to them in alchemical or "chymical" terms.[230] Fighting degeneration and changing the Irish might involve educating, civilizing, converting, and even translating them; *transmuting* them, however, was apparently a new idea. This was not casual. Petty used the phrase and affiliated chymical concepts (mixture and union) repeatedly and consistently, while he only rarely spoke of conversion, civilization, or translation – and always as secondary parts of the grander transmutative process.

Nor was Petty's use of the language of transmutation just another way of saying the same thing as Spenser and Davies had said. Petty's ability to conceive of Irish politics and of his own policy proposals in chymical terms depended in part on the differences between his and their understanding of the Irish and of human nature. Further, it was only because Petty's interpretation of Ireland's problems could be expressed in chymical terms that transmutative political arithmetic – in substance as

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[230] For the use of "chymistry" as against both "alchemy" and "chemistry" in describing mainstream seventeenth-century practice, see Lawrence Principe, *The Aspiring Adept: Robert Boyle and His Alchemical Quest* (Princeton, 1998), 8-10. I have followed Principe in eschewing "chemistry" and have tried to use "alchemy" only where processes central to what he calls "traditional alchemy" – *chrysopoeia* and *argyropoeia*, for instance – seem to be in play. That said, for the simple reason that what follows deals more with language and metaphor than with actual chymical practice, my terminology is less technically precise. "Iatrochemistry" refers to chymistry used in a medical context.

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well as in form – was conceivable at all. The idiom of chymistry was essential to Petty's politics.

It is not easy to see, at first glance, why it should have been. "Transmutation", in Petty's time, described the chymical or alchemical process by which one substance was transformed into another.[231] In Aristotelian physics, the basis for transmutation was the assumption that all substances were composed of the same four elements – fire, air, water, and earth – and given their individual character by specifications of the same pairs of opposite qualities – hot and cold, dryness and moisture. Fire was hot and dry, air hot and wet, earth cold and dry, water cold and wet. Transmutation worked through the qualities: earth might become fire if its coldness became heat, for instance; underlying all the elements, and underpinning their mutual convertibility, was a single prime matter.

By Petty's time Aristotelian transmutation had been supplemented by Paracelsian, Helmontian, and other theories of matter with their own variations and combinations of elements: salt, sulphur and mercury, for example. But the basic premise of transmutation – that the characteristic qualities or components of specific substance might be altered, removed, purified or rearranged to yield something substantially different – remained valid. Beneath the level of theory, transmutation was one of many alchemical or chymical processes whose day-to-day existence was

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[231] On alchemy and chymistry generally, see William R. Newman, *Promethean Ambitions: Alchemy and the Quest to Perfect Nature* (Chicago, 2004). For the early modern period, Bruce T. Moran, *Distilling Knowledge: Alchemy, Chemistry, and the Scientific Revolution* (Cambridge, MA, 2005) offers a concise introduction. Allen G. Debus has surveyed early modern "chemical philosophy" and iatrochemistry in several works; the most relevant here are *The Chemical Philosophy: Paracelsian Science and Medicine in the Sixteenth and Seventeenth Centuries*, 2 vols., (New York, 1977), and *The English Paracelsians* (New York, 1966). Principe, *The Aspiring Adept*, looks in depth at Robert Boyle's pursuit of alchemy.

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rooted in skilled trades like metalworking or dyeing, painting or sculpting. Whether or not the transmutation of base metals like lead into silver (*argyropoeia*) or gold (*chrysopoeia*) – the paradigmatic activity of alchemists in the popular historical imagination – was possible, the everyday manipulation of appearances and the apparent transformation of materials through chemical processes was an established fact. What it had to do with politics is another matter altogether.

Mixed metaphors

Although Petty's use of the word transmutation in both *The Political Anatomy of Ireland* and many manuscripts is noticeable, it is initially less so than his use of more conventional and perhaps less surprising medical and mathematical metaphors. Ireland's political medicine, after all, was composed of political anatomy and political arithmetic, not "political alchemy". Petty was trained as a physician and had studied a fair amount of mathematics; these subjects stand out in his biography and his surviving correspondence; alchemy does not. Petty's first printed work, written for Samuel Hartlib and submitted for the approval of such aspiring alchemical adepts as Robert Boyle, included severall references to chymistry (and one to judicial astrology),[232] but the focus of the medical section was the reform of medical education along *clinical* more than chymical lines. Neither here nor later was Petty's medical language, as might seem likely in an age of iatrochemistry, a conspicuous opportunity for chymical concepts to emerge.

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[232] Petty, *The Advice of W.P. to Mr. Samuel Hartlib Concerning the Advancement of Some Particular Parts of Learning* (London, 1647), 6, 12-13, 16.

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In his preface to *The Political Anatomy of Ireland*, Petty elaborately construed government in anatomical terms, without even a hint of chemical medicine:

> Sir Francis Bacon, in his Advancement of Learning, hath made a judicious Parallel in many particulars, between the Body Natural, and Body Politick, and between the Arts of preserving both in Health and Strength: And it is as reasonable, that as Anatomy is the best foundation of one, so also of the other; and that to practise upon the Politick, without knowing the Symmetry, Fabrick, and Proportion of it, is as casual as the Practice of Old-women and Empyricks.[233]

Petty chose Ireland not for its peculiar ailments but because he knew it and for its youth, an advantage that, again, was strictly anatomical. Petty explained that

> [A]s Students in Medicine, practice their inquiries upon cheap and common *Animals*, and such whose actions they are best acquainted with, and where there is the least confusion and plerpexure of Parts; I have chosen *Ireland* as such a Politicall Animall, who is scarce Twenty years old... and with which I have been conversant from an Embrion[.][234]

Political anatomy, as an instrument of political medicine, appeared rudimentary:

> 'Tis true, that curious Dissections cannot be made without variety of proper Instruments; whereas I have had only a common *Knife* and a *Clout*, instead of the many more helps which such a Work requires; However, my rude approaches being enough to find whereabout the Liver and Spleen, and Lungs lye; tho' not to discern the Lymphatick Vessels, the *Plexus*, *Choroidus*, the *Volvuli* of Vessels within the Testicles; yet... I have ventured to begin a *new* Work, which... I believe will tend to the Peace and Plenty of my Country.[235]

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[233] Petty, *The Political Anatomy of Ireland*, preface (*EW*, 129).

[234] Petty, *The Political Anatomy of Ireland*, preface (*EW*, 129).

[235] Petty, *The Political Anatomy of Ireland*, preface (*EW*, 129-130).

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Here are Bacon and (taking into account Petty's time with Hobbes in Paris) Vesalius, but no hint of the heroes of chemical medicine, Paracelsus or van Helmont. So far as political anatomy was described as medical, it appeared to be at most diagnostic.

Political Arithmetic's guiding metaphor, on the other hand, was the game of tennis, and was in a sense *anti*-mathematical (or at least anti-geometrical), since its *bête noir* was the Euclidean mannerism of Roger Coke. Petty stressed "Number, Weight and Measure", "Arguments of Sense", and "such Causes, as have visible Foundations in Nature" to "the mutable Minds, Opinions, Appetites, and Passions of particular Men".[236] In the slightly later *Discourse... Concerning the Use of Duplicate Proportion*,[237] on the other hand, Petty took mathematical metaphor in quite the opposite direction. Invoking the shades of such noted geometricians as "Mersennus, Gassendy, Mr. Hobs, Monsieur Des Cartes, Monsieur Roberval, Monsieur Mydorge", Petty gave his dedicatee and onetime host in Paris, the Duke of Newcastle, to understand that

> there is a Political Arithmetic, and a Geometrical Justice, to be yet cultivated in the World; the Defects whereof neither Wit, Rhetoric, nor Interest can more than Palliate, never cure. For Falsity, Disproportion, and Inconsistence cannot be rectified by any sermocinations, though made all of figurate and measured periods, pronounced in Tune and Cadence, through the most advantageous organs; much less by Grandisonous or Euphonicall Nonsence, farded with formality; no more than vicious Wines can be remedied with Brandy or Honey, or ill Cookery with enormous Proportions of Spice and Sugar: *Nam Res nolunt malè administrari.*[238]

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[236] Petty, *Political Arithmetick*, preface (*EW*, 244).

[237] Petty, *The Discourse Made before the Royal Society the 26. of November 1674, Concerning the Use of Duplicate Proportion In sundry Important Particulars: Together with a New Hypothesis of Springing or Elastique Motions* (London, 1674).

[238] Petty, *Discourse Concerning Duplicate Proportion*, epistle dedicatory to the Duke of Newcastle.

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In *Political Arithmetick*, empirical arithmetic dispatched pettifogging geometry on the tennis court; in the *Discourse*, arithmetic and geometry joined forces to defeat rhetoric in the kitchen. But the "grandisonous" culinary conceit aside, none of this is remotely chymical. Nor is it particularly consistent. Nor is that at all surprising: these were metaphors, used in prefaces or dedications. They could be, and were, taken up or dropped at their author's convenience.

The actual stuff of political arithmetic in *Political Arithmetick*, like that of *The Political Anatomy of Ireland*, had more in common with natural history than with either medicine or mathematics. The first text focused on the interactions of "situation, trade, and policy", the second on the "symmetry, fabric, and proportion" of Ireland's body politic (with plenty of attention to her "situation, trade and policy" as well). Like many earlier writers, Petty claimed to deduce "the manners of the Irish"

> from the Original Consitutions of the Body, and from the Air; next from their ordinary Food; next from their Condition of Estate and Liberty, and from the influence of their Governours and Teachers; and lastly, from their Ancient Customs, which affect as well their consciences as their Nature.[239]

This sounds like promising ground for a study of Petty's conception of the human body and its relationship to environment. Unfortunately, it is not. We have already seen how little faith Petty actually placed in the transmutative capacity of many of the traditional influences hinted at above; much the same goes for the constitution of the body. Petty blandly concluded the paragraph with the observation that as

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[239] Petty, *The Political Anatomy of Ireland*, 98 (*EW*, 201).

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> For their Shape, Stature, Colour, and Complexion, I see nothing in them inferior to any other People, nor any enormous predominancy of any humour.[240]

In contrast to the Boate brothers, for example – and it is worth noting in passing that Hartlib asked Petty, among others, to complete the Boates' *Irelands Naturall History*[241] – Petty saw little worthy of comment in Irish complexions, though diet was a recurring concern. Much more important were living conditions, education, customs, and political contingencies. "Their Lazing," he wrote,

> seems to me to proceed rather from want of Imployment and Encouragement to Work, than from the natural abundance of Flegm in their Bowels and Blood; for what need they to Work, who can content themselves with Potato's, whereof the Labour of one Man can feed forty; and with Milk, whereof one Cow will, in Summer time, give meat and drink enough for three Men[?] ... And why should they desire to fare better, tho with more Labour, when they are taught, that this way of Living is more like the Patriarchs of old, and the Saints of later times, by whose Prayers and Merits they are to be reliev'd, and whose Examples they are therefore to follow? And why should they breed more Cattel, since 'tis Penal to import them into England?[242]

"They are accused also of much Treachery, Falseness, and Thievery," Petty continued, "none of all which, I conceive, is natural to them." Their treachery was based on their hope of recovering their land from the English, and "As for Thievery,

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[240] Petty, *The Political Anatomy of Ireland*, 98 (*EW*, 201).

[241] Gerard Boate, *Irelands Naturall History* (London, 1652). See Toby Barnard, "The Hartlib Circle and the Cult and Culture of Improvement in Ireland", in Mark Greengrass, Michael Leslie, and Timothy Raylor (eds.), *Samuel Hartlib and the Universal Reformation: Studies in Intellectual Communication* (Cambridge, 1994), 281-297; Barnard, "The Hartlib Circle and the Origins of the Dublin Philosophical Society", *Irish Historical Studies* 19:73 (1974), 56-71; Barnard, "Myles Symner and the New Learning in Seventeenth-Century Ireland", *Journal of the Royal Society of Antiquaries of Ireland* 102:2 (1972), 129-142.

[242] Petty, *The Political Anatomy of Ireland*, 98-99 (*EW*, 201).

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it is affix'd to all thin-people'd Countries, such as Ireland is[.]"[243] Despite its free use of medical metaphor, political anatomy was an essentially social and political mode of analysis. Situation mattered in political-arithmetical terms because of its influence on social forms, not because of its influence, say, on the six non-naturals of Galenic physiology – even if these were a real concern on an individual basis. Petty's mathematical and medical metaphors were just that. Transmutation was something else.

Transmutation and union in Ireland

The ultimate task of political anatomy was to identify actual or potential sources of political instability within a subject population. Centuries of English experience in Ireland highlighted the importance of religious and more general cultural difference (the degeneration of the Old English was a broadly cultural rather than a narrowly confessional phenomenon) as a marker of political disaffection vis-à-vis the colonial regime. For well over a century the wild Irish in particular had been distinguished, and denigrated, in terms of their political, religious, and social institutions and customs – from their clothing and hairstyles to their houses, housekeeping, and slavish dependence on warlords and priests.

More recently English writing had come to focus on the susceptibility of the English planters themselves (particularly Old English Catholics) to cultural and eventually racial degeneration through association with their barbarous neighbors. Like the questions Petty would later ask about Native Americans, much of the

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[243] Petty, *The Political Anatomy of Ireland*, 100 (*EW*, 202).

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information he thought relevant to considering English stability in Ireland was information about the cultural environment, of obvious relevance in assessing the risk of degeneration (or, in the case of Ireland, the extent of its ravages).

Petty's innovation in the context of English thinking about Ireland and other colonies was to express these distinctions in quantitative demographic rather than more or less straightforwardly ethnic terms. He realized that if politically significant cultural difference could be located in specifiable demographic groups, then the political instability this difference vcreated could be tied to the relative demographic preponderance of different groups, which might coincide with the traditional, qualitative, almost "natural" (in the sense of preexisting) national and confessional categories, but which might also be analytically constructed around specific political issues like the land settlement. Further, and more important in practical political terms, if political instability could be expressed as a set of demographic ratios, the maintenance of political stability (which is to say, the central task of English government in Ireland) could be seen as a fairly simple matter of maintaining favorable ratios and altering unfavorable ones. This was the promise of transmutative political arithmetic, and this is where the medical metaphors and even the mathematics drop out of the picture and transmutation comes to the fore.

Having resolved Ireland's problems into matters of demographic proportion in *The Political Anatomy of Ireland*, Petty proposed "the transmuting one People into the other, and the thorough union of Interests upon natural and lasting Principles[.]"[244] The first proposal he made was a simple exchange of populations designed to shift the demographic balance between British Protestants and Irish

[244] Petty, *The Political Anatomy of Ireland*, 29 (*EW*, 157).

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Catholics in the bluntest way, substituting 200,000 of the former for the same number of the latter. This straightforward exchange made the simple but fundamental point that politics could be stabilized by changing the proportions between different elements of the body politic. But it is hard to think that it represented any "thorough union of Interests" – on the contrary, it simply surrounded adherents of one interest with more and better-armed adherents of another. Yet a "natural and lasting" transmutation was not a vague, metaphorical aspiration but a specific, distinct policy aim. It simply required a more intricate exchange: this time of young, unmarried women. To quote the crucial passage again from *Political Anatomy*:

> There are among the 600,000... poor Irish, not above 20,000 of unmarried marriageable Women; nor would above two thousand per Annum grow and become such. Wherefore if 1/2 the said Women were in one year, and 1/2 the next transported into England... and as many English brought back and married to the Irish, as would improve their Dwelling but to an House and Garden of £3 value, the whole Work of natural Transmutation and Union would in 4 or 5 years be accomplished.[245]

Obviously it is the exchange of 20,000 very possibly unwilling women that grabs the reader's attention here, but the house and garden, ancillary though they are, are also important. An outright exchange of 200,000 families would swamp the Irish with more powerful English neighbours, but it would not change the Irish themselves. The exchange of women, on the other hand, was less about altering demographic proportions *immediately* (in a way that might only heighten tensions) than about sowing the seeds of future union by transforming Irish households. Since Elizabethan

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[245] Petty, *The Political Anatomy of Ireland*, 30 (*EW*, 158).

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times at least, English assessments of Irish barbarity had dwelt on many essentially household matters – hair, clothing, diet, housing itself – and on wider social patterns whose disadvantages manifested themselves in the household, such as the political dominance of septs, which relied on intermarriage and the fostering of children or the influence of priests, who worked on men through their wives. Petty's idea was to change the Irish by working through the very structure that gave them their Irish characteristics.

This was what we might think of (following *Political Arithmetick*) as the "situation, trade and policy" of the household itself. It included the material conditions of household life: Petty considered the "wretched cabbins" of the Irish not only as a symbol of Irish barbarity, but also a contributing factor to it. English houses – built of brick, and with "smokes" (which, incidentally, would make them subject to the Hearth Tax) – were potential sites of butter and linen manufacture. But they were also, and more importantly in the present context, a necessary condition for the exchange of women. This was because the "policy" aspect of the oeconomy of the household – here, the division of labor between husband and wife, and the latter's dominance in household management and in rearing children under seven – depended in a concrete way on the conditions in which it worked. Irish cabins could no more produce or sustain English housewives than France (in *Political Arithmetick*) could become a natural naval power: Nature was against it, and no matter how vigorously money was thrown at it, it would not work. But English policy in Ireland could change the "situation" itself by razing the cabins and building English houses – the

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"natural" spaces of English housewifery – in their place. And this is just what Petty suggested, over and over again.

The conditions prepared, the women would come, or, more accurately, be pressed into service. At this point, natural, or at least non-political, social processes would take over:

> [W]hen... the Women, who influence... powerful Appetites, shall be English... being in the Bosom of the Men, it must be, that no massacring of the English... can happen again.[246]

The dual role of women in early modern households, natural to the situation Petty's policies would create, was crucial. So was Petty's apparent assumption that Irish natures and motivations were not essentially different from those of the English or other civilized men, an assumption that distanced him from many other writers on the subject. With respect to their future husbands, the women were important as the sexual objects of completely natural, and not necessarily barbarian, appetites. Petty seemed to think that the very Englishness of these women would, once they were "in the Bosom of the men", prevent their new husbands from killing their wives' countrymen. But over the longer term it was the women's other role, as mothers and educators, and particularly as teachers of language to their young children, that came to the fore:

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[246] Petty, *The Political Anatomy of Ireland*, 31 (*EW*, 158-159). I have here omitted Petty's comments on priests, quoted with this passage in the previous chapter. They play a somewhat similar role – just as women influence "powerful appetites", priests "govern the Conscience." But over the longer term it seems evident that the women, given their maternal role, were the more important part of the equation, and the exchange of women dominated Petty's subsequent proposals for transplantation.

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> when the Language of the Children shall be English, and the whole Oeconomy of the Family English, viz., Diet, Apparel, &c., the Transmutation will be very easy and quick.[247]

Or, as another manuscript entitled "About Exchanging of Women", dated March 1674, put it,

> If 7000 English poore Women were yearly brought out of England to Marry the like Number of Poorer Irish Men then in 20 Yeares The Mother or Mistress of every of the said familys would bee an English protestant woman, and Consequently The Manners, Language & perhaps the Religion of all the sayd familys would be English.[248]

Making the Irish more English was a very old idea by the 1670s, and Petty was clearly familiar with some of its prominent exponents. These authors had usually proposed essentially institutional changes: more force, firmer laws, more unified administration. For most English writers on Ireland the main concern was degeneration, and the only way to secure plantations against this was to keep the English, as agents of civilization, well clear of the Irish and their contaminating influence. The ideal English plantation might be a shining example to the Irish, but to teach effectively by example it had to keep the barbarians at arm's length and in clear subjection; there was never any question of contact *within* the household. To these authors, Petty's notion of "proportionable mixture" would have sounded like madness – not so much (as for us) because it called for massive forced migration, which was

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[247] Petty, *Political Anatomy*, 31 (*EW*, 158-159).

[248] BL MS Add. 72879, f.71.

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new neither to the seventeenth century nor to Ireland,[249] but because it would have looked like a shortcut to the very degeneration they were trying to prevent.

In fact, this is exactly how one of Petty's most articulate critics, the Lord Chief Justice of Ireland, Sir Richard Cox, responded. "[I]f a million of Women were married to as many poor Irish," Cox wrote after reading a manuscript of *Political Anatomy* in 1687, "it is certain they would degenerate into meer Irish & that in a few years[.]" He added, the fate of the Old English no doubt in mind, that "experience proves my assertion."[250] Spenser or Davies would have said much the same. The dominant view of plantation as the task of virtuous and godly men with swords in one hand and Bibles in the other had little in common with Petty's brand of demographic politics.[251]

Transmutative political arithmetic marked a major break with mainstream thinking on Ireland, a break whose direction is indicated by Petty's two slogans, "Let Nature Work" and "*Res nolunt male administrari.*"[252] Policy had to work with nature. Rather than relying on the power of English arms and English culture to reform Irish

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[249] See Patrick J. Duffy, "Introduction: Migration management in Ireland", in Patrick J. Duffy (ed.), *To and From Ireland: Planned Migration Schemes c.1600-2000* (Dublin, 2004), 1-15, especially 5-8.

[250] BL MS Add. 21127, f.54.

[251] This is not to say that all earlier approaches were fundamentally alike: the sword and the Word were themselves sometimes rivals. See Brendan Bradshaw, "Sword, Word and Strategy in the Reformation in Ireland", *Historical Journal* 21:3 (1978), 475-502. Spenser, Davies, Barnabe Rich, and later on the Boate brothers – in short, most of Petty's most likely sources – came down more on the "sword" side of the debate.

[252] Occurring sometimes with slight variations: "give Nature Leave to Work", Petty to Southwell, 9 August 1684 (*Correspondence*, 125). For the Latin phrase compare Petty, *A Treatise of Taxes and Contributions* (London, 1662), preface (*EW*, 9); Petty, *The Discourse... Concerning the Use of Duplicate Proportion* (London, 1674), epistle dedicatory; Petty to Southwell, 9 March 1677/8 (*Correspondence*, 52); Petty to Southwell, 10 September 1678 (*Correspondence*, 59): "*nec volunt res mali administrari*"; Petty to Southwell, 29 May 1686 (*Correspondence*, 204).

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nature, as English writers and policymakers had tried for a century and more to do (without any sign of success), Petty sought policies that would create conditions such that natural processes – in the first instance, sex – would transform Irish culture. Whereas earlier writers had stressed the alien, intractably barbarian nature of the Irish, for Petty it was precisely their natural appetites that underlay the whole program. The sexual drive of Irish men was what guaranteed the influence over them of English women and, ultimately, their alliance with English interests. And, further, this alliance, or identity, or, to use Petty's words, "natural and fundamental union" of interests was all that mattered.

Petty was relatively uninterested in *civilizing* the Irish (though he was as ready as anyone to claim that they owed what civilization they had to the English), and even less in converting them to Protestantism (though voluntary conversion might be desirable as one outward sign of a loyal disposition). His guiding aim was political stability, which he conceived of in terms of the reconciliation of interests. These were not, as far as political arithmetic was concerned, matters of abstract principle but rather of concrete human behavior. This was what made them tractable. Interests were embodied in human beings with human drives. On a national scale, these interests could be located in human collectivities whose numbers and distribution could be managed by policy. The same policy might create new conditions, on a household scale, in which human nature itself intervened on the side of the English. Transmutative political arithmetic worked by making the English interest the natural interest for the Irish. Given English houses and wives, and the ground prepared by toleration, Irish men would have no reason to hate the English and good reasons not

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to. Raised by English mothers, their children would no longer even distinguish between the two. This was the meaning of union.

The various elements of the program came together in Petty's manuscripts between roughly 1671 and 1675. Petty continued to advocate the counter-transplantation of women for most of the rest of his life. Little less marked is his persistent use of the language of transmutation to describe the goals of his project. In *Political Arithmetick* Petty had called for "a natural and firm union... between the two Peoples, by Transplantations, and proportionable mixture[.]"[253] A set of proposals dated to some point in the 1670s proposed "To transmute the Irish into English",[254] while "A Generall Proposall for England and Ireland" promised "To transmute the Irish into English in 9 yeares."[255] Speaking in another paper of the possibility of legislative union between England and Ireland, Petty emphasized that it "Will help the transmutation of Irish into English[.]"[256] The same language occurs in proposals from the 1680s: in a paper of 1685 listing "40 Desiderata Considerata", Petty included "Transmuting the Irish" as a matter of course.[257] Throughout, the stated aim of "real and fundamental union" between the Irish and English people – in addition to, but above that of their respective governments – is conceived of as depending on this transmutation.

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[253] Petty, *Political Arithmetick*, 92 (*EW*, 300).

[254] BL MS Add. 72865, ff.140-142.

[255] BL MS Add. 72865, ff.143-144.

[256] BL MS Add. 72879, f.81.

[257] BL MS Add. 72866, ff.1-2.

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Origins of an analogy

But what did Petty's specific use of transmutation mean? Clearly, it was more than a metaphor – at least, in the sense that the game of tennis in *Political Arithmetick* or anatomy itself in *The Political Anatomy of Ireland* were metaphors. The latter served to make a point – the importance of practical observation, for instance. Transmutation is not used in this way. It appears instead to distinguish Petty's political goals from others who have written about the same political problems. But how? Using transmutation as a loose description of what Petty wanted for Ireland might have distinguished him from the "furious Spirits" who wanted to exterminate the Irish, but the difference between Petty's transmutation and, say, Spenser's "translation" is harder to see – particularly since Spenser, too, had been concerned with numbers. On the other hand, Petty's emphasis on large-scale transplantation and intermarriage would seem to distinguish his ideas substantially from those of almost any other writer before or since. As a sort of metaphorical label, then, transmutation was unnecessary. In any case, its occurrence in the manuscripts does not support this reading. It appears only once in direct opposition to rival ideas, in the fifth chapter of *The Political Anatomy of Ireland*. The rest of the time it is flatly stated as the outcome of Petty's proposals. Compared with Petty's almost painful elaboration of his anatomical conceit in the preface to *Political Anatomy*, the range of sports deployed against Coke in the preface to *Political Arithmetick*, or the verbosity of his mathematical assault on rhetoric in the dedication to the *Discourse... Concerning the Uses of Duplicate Proportion*, transmutation remains unusually undeveloped.

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Yet consider how apt the analogy is: Just as the chymist transmutes substances, so the political arithmetician transmutes populations, and by a closely parallel process. Compound populations, like compound substances, have to be analyzed into their elements, from whose qualities and relative proportions they derive their characteristics. The chymist could transmute one substance into another by removing certain elements, refining them, exchanging them or mixing them with others; the political arithmetician, having analyzed a population into subgroups relevant to a given political question, altered the proportions between the subgroups, introduced new ones, or mixed different kinds of people together. The product in both instances was something qualitatively different. Further, just as the chymist worked in a carefully constructed laboratory, so the processes Petty's political arithmetic brought to bear on the people he sought to transmute would only work correctly if the initial conditions (in this case, institutional, legal, social and material conditions) were carefully prepared. These parallels may seem heuristically convenient – perhaps a little too convenient. But reading Petty's proposals through his chymical language is not a wholly arbitrary operation; there are good reasons for thinking that this is how he saw them himself.

In the first place, it seems noteworthy not only that in seventeen years' worth of manuscripts Petty used transmutation consistently but also, probably more significantly, that he never used another word in its place. Petty found no new metaphor for what he wanted to do in Ireland. Nor did he ever really talk about his ultimate goal in more concrete language; for all intents and purposes, transmutation *was* the concrete language for talking about the future of Ireland in political-

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arithmetical terms. Given the curious combination of philosophical mistrust and rhetorical enthusiasm with which Petty treated metaphorical modes of expression, this is itself unusual. It suggests the possibility that Petty used the language of transmutation because it was the only language in which what he thought he was doing could be worked out to his satisfaction. He did not, after all, want to civilize the Irish, or convert them, or simply subdue them, or even "translate" them. He wanted to make them not only *the same as* the English, but *one with* the English – to fuse the two completely. Petty shows no awareness of any available political language for this goal. But the language of chymistry – of transmutation, of proportionable mixture, and of union – was a perfect fit.

Petty's predisposition to use that language is another matter. His first encounter with transmutation and associated processes probably came when he was a child in Romsey. His father was "a clothier, and also did dye his own clothes",[258] and Petty may worked in the business himself for a brief period some years later as a young man. Much later, the Royal Society assigned him the task of writing a history of the trade for its "history of trades" program. This is one of those rare instances where asking Petty to write something worked: "The History of Dy[e]ing or Tinctures" appeared in 1662.[259] The "History" begins by proposing "a Retrospect into the very nature of Light it self (as to inquire whether the same be a Motion or a

[258] Aubrey (ed. O.L. Dick), *Brief Lives*, 237.

[259] The manuscript is in BL MS Add. 72897, ff.1-37. Petty's history was printed in Thomas Sprat's history of the Royal Society as "An Apparatus to the History of Common Practices of Dyeing": Sprat, *The History of the Royal-Society of London, for the Improving of Natural Knowledge* (London, 1667), 284-306.

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Body;)" – which may recall Petty's time with Hobbes, of which more below – and "to consider the very essentials of Colour and Transparencies":

> That great depths of Air make a Blew, and great depths of Water a Greenish colour...
>
> That most Vegetables, at one time or other, are greenish.... Other things are whitened by acid Fumes, as red Roses and raw Silks by the smoak of Brimstone.
>
> Many Mettals, as Steel and Silver, become of various colours and Tarnish by the air, and by several degrees of heat.
>
> We might consider the wonderful variety of colours appearing in Flowers, Feathers; and drawn from Mettals, their Calces and Vitrifications; and of the colours rising out of transparent Liquors artificially mixed.[260]

Calcination – heating a metal in a furnace so that it produced an ash, or calx – and vitrification – treating metals with vitriol – were processes central to chymistry and much written about in chymical and alchemical treatises (Petty also mentions artificial mixture). Theory, however, interested Petty less than practice.

> [T]hese things, relating to the abstracted nature of colours, being too hard for me, I wholly decline; rather passing to name (and but to name) some of the several sorts of Colorations now commonly used in Humane affairs, and as vulgar Trades in these Nations[.][261]

He then listed nineteen such instances, including the "whitening of Wax, and several sort of Linen and Cotton Cloathes, by the Sun"; "Colouring of Wood and Leather by Limes, Salt, and Liquors"; "Coloring or rather Discolorig the colours of Silks, Tiffanies, &c. by Brimstone"; "Colouring of... Silver leaves into Gold by Varnishes, and in other cases by Urine & Sulphur"; "Guilding and Tinning with *Mercury*, *Block-*

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[260] Petty, "History of Dyeing", in Sprat, *History of the Royal Society*, 284-285.

[261] Petty, "History of Dyeing", in Sprat, *History of the Royal Society*, 285.

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Tin, *Sal Ammoniack*"; "Colouring Metals, as Copper with *Calamy* into Brass, or with *Zinc* or *Spelter* into Gold, or into Silver with *Arsenick*: And of Iron into Copper with *Hungarian Vitriol*"; and

> The last I shall name is the colouring of Wool, Linnen, Cotton, Silk, Hair, Feathers, Horn, Leather and the Threads or Webs of them with Woods, Roots, Herbs, Seeds, Leaves, Salts, Limes, Lixiviums, Waters, Heats, Fermentations, Macerations, and other great variety of Handling[.][262]

Petty proceeded to detail the uses in various dyeing techniques of different mineral, animal and (after a digression on the differences between river-water and well-water relevant to dyeing)[263] vegetable products, occasionally speculating on their precise chymical function but more often simply noting when dyers used them and why. The "History" ended with a few dozen further "General Observations upon Dyeing", dealing with such matters as the effect of different dyes on the weight of different materials.[264] What Petty learned in Romsey and what from later books and conversations is impossible to sort out. But his approach in the "History" clearly emphasized practical techniques and recipes over "the abstracted nature of colours", the reality and durability of change rather than the theory behind it. And Petty was clearly familiar with chymical concepts and processes, perhaps from an early age.

Dyeing was not Petty's only point of access to these ideas. His medical training was another. While in Amsterdam in the early 1640s, Petty met the English

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[262] Petty, "History of Dyeing", in Sprat, *History of the Royal Society*, 285-287.

[263] Petty, "History of Dyeing", in Sprat, *History of the Royal Society*, 292-293.

[264] Petty, "History of Dyeing", in Sprat, *History of the Royal Society*, 302-306.

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mathematician John Pell, and after moving on to study in Leiden in late 1644 he did Pell the favor of distributing some manuscripts of his *Refutation of Longomontanus's Pretended Quadrature of the Circle*. Two letters to Pell reporting Petty's progress on this early mission of manuscript circulation provide something of a picture of Petty's intellectual surroundings.[265] The list of recipients for Pell's work included, among others, Jacob Golius, Professor of Oriental Languages at Leiden; the Huguenot classicist and "polyhistor"[266] Claude de Saumaise (Salmasius), described by Petty as "Professor Honorarius" and later author of the anti-regicide tract *Defensio regia pro Carolo I*, which drew a response from Milton;[267] the prominent numismatist Ezechiel Spanheim; and Adriaan Heereboord, a Cartesian, and successor in the chair of philosophy to his teacher Franco Burgersdijck, who, according to one modern commentator, "taught the physics and metaphysics that had long made astrology and natural magic departments of natural philosophy".[268]

Leiden was best known for its pioneering role in both clinical and chemical medicine, and other names that crop up in the letters are more directly relevant here. Petty described Joncker Horghland as "a Chymist and Physician, Des Cartes his most intimate friend", and promised to get Pell's paper to the latter through the former.

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[265] Petty to Pell, 14/24 August and 29 August/8 September 1644; both letters are printed in Fitzmaurice, *The Life of Sir William Petty*, 8-10.

[266] Anthony Grafton quotes a contemporary description of him as "a man from whom one could cut three specialists"; see Grafton, *Bring Out Your Dead: The Past as Revelation* (Cambridge, MA, 2001), 185.

[267] See the brief biographical entry in the apendix to J.H. Burns and Mark Goldie (eds.), *The Cambridge History of Political Thought, 1450-1700* (Cambridge, 1991), 693.

[268] Brian Copenhaver, "The Occultist Tradition and Its Critics", in Daniel Garber and Michael Ayers (eds.), *The Cambridge History of Seventeenth-Century Philosophy*, 2 vols. (Cambridge, 1998), 1:457-458.

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Another recipient of Pell's paper was Jan de Wale, or Johannes Walaeus, Professor of Medicine at Leiden while Petty studied there and very likely one of Petty's teachers. Walaeus, one of the older generation,[269] had been trained and had begun teaching as a Galenist; his relatively recent conversion to Harvey's theory of the circulation of the blood was the work of his friend François de le Boë, better known as Franciscus Sylvius.[270] Sylvius was a prominent figure in the insitutionalization of chemical medicine, or iatrochemistry. A graduate of the University of Leiden, he set up the first academic iatrochemical laboratory there, though this was after Petty had come and gone. Whether or not Petty had any direct contact with Sylvius is impossible to say. One thing that is clear is that he studied some chymistry while in Leiden as a medical student. In a list of his writings that he drew up in 1671, he included "An history of 7 monthes practise in a Chymicall Laboratory", descriibed as having been written in Holland in 1645. That "history" would undoubtedly be a very useful document to have; unfortunately, as Petty noted, it was "lost at sea."[271]

Signs of Leiden's influence emerge in Petty's association with the Hartlib circle in the later 1640s. The circle was a group of philosophers, experimentalists, inventors and social and political reformers whose activities were fostered and to some extent coordinated by Samuel Hartlib, a German emigré to revolutionary England. Taking many of its philosophical cues from Francis Bacon, the group aimed at a "universal reformation" of society and religion, in part through labor-saving

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[269] He may also have taught Sir Thomas Browne, as he held the same post when the latter studied in Leiden in 1633-4. See Jeremiah S. Finch, *Sir Thomas Browne: A Doctor's Life of Science and Faith* (New York, 1961), 70.

[270] See Allen Debus, *The Chemical Philosophy*, 2:529.

[271] *Petty Papers*, 2:260-262.

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technological developments and in part through the reform of philosophy and education in a more utilitarian direction.[272] These reforms often had a chymical or alchemical side to them: Gabriel Plattes's utopian *Description of the Famous Kingdome of Macaria*,[273] one of the more famous Hartlibian texts, referred Parliament to Plattes's earlier work on alchemy and metallurgy with a view to increasing the wealth of the kingdom, while Benjamin Worsley – Petty's future nemesis in the battle over the Down Survey – planned to produce saltpetre alchemically for use in agriculture.[274] Petty himself came into contact with Hartlib soon after returning to England in 1646, through their common membership in the so-called "1645 Group" of experimental philosophers. Hartlib welcomed Petty with enthusiasm, and introduced him to Robert Boyle as a sort of lesser Worsley:

> I cannot but tender to your favourable hands... the design of the *History of Trades*. The author of them is one *Petty*, of twenty four years of age, not altogether a very dear *Worsley*, but a perfect Frenchman and a good linguist in other vulgar languages besides Latin

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[272] See Mark Greengrass, Michael Leslie, and Timothy Raylor (eds.), *Samuel Hartlib and the Universal Reformation: Studies in Intellectual Communication* (Cambridge, 1994); Charles Webster, *The Great Instauration: Science, Medicine, and Reform 1626-1660* (London, 1975). Hartlib's papers were discovered early in the twentieth century, but were only recently catalogued (and put on CD-ROM). The first major work on the subject using the papers was George H. Turnbull, *Hartlib, Dury and Comenius: Gleanings from Hartlib's Papers* (London, 1947). See also Dorothy Stimson, "Comenius and the Invisible College", *Isis* 23:2 (1935), 373-388; Stimson, "Hartlib, Haak and Oldenburg: Intelligencers", *Isis* 31:2 (1940), 309-326; Webster's revision in "New Light on the Invisible College: The Social Relations of English Science in the Mid-Seventeenth Century", *Transactions of the Royal Historical Society*, Fifth Series, 24 (1974), 19-42.

[273] [Gabriel Plattes], *A Description of the Famous Kingdome of Macaria; Showing Its Excellent Government: Wherein the Inhabitants live in great Prosperity, Health, and Happinesse; the King obeyed, the Nobles honoured; and all good men respected; Vice punished, and vertue rewarded. An Example to Other Nations. In a Dialogue between a Schollar and a Traveller* (London, 1641). The book was published by Hartlib but Charles Webster has established Plattes's authorship: Webster, "The Authorship and Significance of *Macaria*", *Past and Present* 56 (1972), 34-48.

[274] For this and Worlsey's other schemes, see Charles Webster, "Benjamin Worsley: Engineering for Universal Reform from the Invisible College to the Navigation Act", in Greengrass et al. (eds.), *Samuel Hartlib and the Universal Reformation*, 213-235.

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> and Greek, a most rare and excellent anatomist, and excelling in all mathematical and mechanical learning; of a sweet natural disposition and moral comportment.[275]

Petty's later fracas with Worsley would put his natural sweetness in some doubt, but his competence was never questioned.

The "design" mentioned above was Petty's first printed work, *The Advice or W.P. to Mr. Samuel Hartlib Concerning the Advancement of Some Particular Parts of Learning*,[276] in which he laid out a project for the reform of education – replacing classical scholarship with practical and experimental knowledge – along lines familiar from Bacon and common to the works of other Hartlibians. An "Office of Address"[277] would oversee a complete audit of existing knowledge, producing a digest of what was reliable[278] and a program for finding out what was not. Schools would become "literary workhouses" (*ergastula literaria*) wherein children would learn by observing and handling things before learning the words associated with them; they would also learn some form of manufacture – vocational training for poorer children, a safeguard against future "couzening" for the richer ones.[279] A college for tradesmen (*gymnasium mechanicum*) would sponsor those particularly expert in particular trades and serve as a market for their wares,[280] while a combination trade-and-natural-

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[275] Hartlib to Boyle, 16 November 1647, in Michael Hunter, Antonio Clericuzio, and Lawrence Principe (eds.), *The Correspondence of Robert Boyle* (London, 2001), 1:63-64.

[276] Petty, *The Advice of W.P.*

[277] Following an idea put forward by Hartlib in imitation of Théophraste Renaudot: see [Hartlib], *A further Discoverie of the Office of Publick Address for Accomodations* (London, 1648).

[278] An idea similar to proposals in Jan Amos Comenius, *A Reformation of Schooles, Designed in Two Excellent Treatises* (London, 1642) and John Dury, *The Reformed Librarie-Keeper* (London, 1650).

[279] Petty, *Advice*, 3-6.

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history museum (*nosecomium academicum*) would house specimens of every natural or artificial creation known to man: "the Epitome or Abstract of the whole world[.]"[281] But the largest and most detailed section of the *Advice* described at great length a model teaching hospital, where an ordered bureacracy of physicians, surgeons, apothecaries, nurses, and students would not only treat patients, but also compile the histories of their illnesses and cures.[282] This stress on clinical training and combination of traditional academic medicine with both surgery and pharmacy (this last strongly influenced by new chemical remedies) all under one roof strongly suggests Leiden's example.

Whether or not Petty's conception of medicine, his trade background or some combination of the two influenced him most, he was evidently familiar with the role of chymistry and chymical processes in a variety of fields. Hartlib asked him to translate the well-known Helmontian chymist (much admired by Sylvius)[283] Johann Rudolph Glauber's treatise on distillation, *Furni novi philosophici*, when Worsley was unavailable, which may constitute further indirect evidence of Petty's chymical competence.[284] In the event, it was evidence also of his unreliability – he never got around to the job, and the translation that finally appeared in 1651 was the work of

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[280] Petty, *Advice*, 7-8.

[281] Petty, *Advice*, 8-9. The description of "Salomon's House" in Francis Bacon's *New Atlantis* prefigures this.

[282] Petty, *Advice*, 9-17. Some aspects of this are similar to Plattes's ideas in *Macaria*.

[283] See Pamela H. Smith, *The Body of the Artisan: Art and Experience in the Scientific Revolution* (Chicago, 2004), 183ff.

[284] On Glauber see Debus, *The Chemical Philosophy*, 2:425-442.

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others.[285] Even so, Hartlib is unlikely to have entrusted the task to someone he thought inexpert. Petty seemed just the man to handle a work that dealt with the extraction of animal, vegetable, and mineral "Spirits, Oyles, [and] Flowers" for "Chymical and Medicinal Use."[286]

His interest in chymistry persisted. We have already seen his "History of Dy[e]ing or Tinctures", and his scheme for the Royal Society's "history of trades" program proposes further histories "Of finding, digging, smelting, refining, separating, compounding of metals, and working the same into several uses", "Of distillation, sublimation, calcinations, chrystallization, vitrification, phosphorization", as well as "Of salts, saltpeter, alum, vitriol, sugar, borax, sal ammoniac," among other things.[287] An undated list of subjects for essays Petty planned to write included essays on "Fermentations", "Distilation", "Of Mercury", "Of Sugar, Salt, Allum", "Of Sulphur, Copper, Brimstone", "Of Chymneys, Furnaces, Ovens, Stoves, bellowes", and, simply, "Chymicall."[288] The language of chymistry was familiar territory for Petty. But why apply this language to politics?

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[285] Glauber (trans. J[ohn] F[rench]), *A Description of New Philosophical Furnaces, Or A New Art of Distilling, divided into five parts. Whereunto is added a Description of the Tincture of Gold, or the true Aurum Potabile; also, the First Part of the Mineral Work. Set forth and published for the sakes of them that are studious of the Truth* (London, 1651).

[286] Glauber, *New Philosophical Furnaces*, 1.

[287] *Petty Papers*, 1:205.

[288] *Petty Papers*, 2:266-269.

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Chymical politics

The beginnings of an answer may lie in the enduring influence of Hobbes on Petty's vision of politics. When Petty had met him, in 1645, Hobbes was already famous for *The Elements of Law* (1640), a pro-royalist assertion of absolute sovereignty in which, to quote one modern scholar, he "attempted to base his political principles on an account of human psychology that was compatible with... his mechanistic physics",[289] and *De cive* (1642), which Petty would recommend to his sons as essential reading. Hobbes's particular emphasis in the latter work and in *Leviathan* (1651) on the importance of definition[290] – and his use of definitions as *a priori* refutations of rival theories – made an especially enduring mark on Petty, as even his latest manuscripts attest. In papers ranging from "An Explication of Trade and Its Increase" (c.1671)[291] to "The Dictionary of Sensible Words" (1685),[292] Petty offered definitions as a means of "making things intelligible" – distinguishing between words with "the same meaning", "many meanings", words that referred to

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[289] Noel Malcolm, "A Summary Biography of Hobbes", in Tom Sorell (ed.), *The Cambridge Companion to Hobbes* (Cambridge, 1996), 27.

[290] See for instance Hobbes, *Leviathan* (London, 1651), I.iv:

> Seeing then that *truth* consisteth in the right ordering of names in our affirmations, a man that seeketh precise *truth*, had need to remember what every name he uses stands for; and to place it accordingly; or else he will find himself entangled in words, as a bird in lime-twiggs; the more he struggles, the more belimed. And therefore in Geometry, (which is the onely Science that it hath pleased God hitherto to bestow on mankind,) men begin at settling the significations of their words; which settling of significations, they call *Definitions*; and place them at the beginning of their reckoning.

This recalls Petty's idea, in *The Advice of W.P. to Mr. Samuel Hartlib* (1647) that children be taught to know objects before the words that describe them; see above.

[291] BL MS Add. 72865, ff.108-115; printed in *Petty Papers*, 1:210-214.

[292] BL MS Add. 72898, ff.118-119; printed in *Petty Papers*, 1:150.

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nothing intelligible at all and those which "by reason of having too many meanings have none"[293] – and cordoning off the unintelligible from serious consideration.

This essentially Hobbesian tool drove many of Petty's discussions of politics and religion ("Religion must consist of Mysteries which can never bee proved nor refuted")[294] throughout his life:

> The words prerogative, privilege of parliament, Liberty of the Subject, the word faith, Sovereignty of the Seas, mare Clausum, The Kings Chambers, Altum Mare, and severall others, were never expressed in Terms of Sense; nor the positions concerning the same made intelligible much lesse demonstrable.[295]

Texts like *Political Arithmetick* and *The Political Anatomy of Ireland*, which dealt in "number, weight and measure" and used only "arguments of sense", on the other hand, might make politics intelligible and political questions demonstrable.[296] This was not exactly Hobbes's deductive science of politics – almost everything Petty says about Roger Coke in the preface to *Political Arithmetick* could be said, at least superficially, of Hobbes as well – but it was argued in self-consciously Hobbesian style. And for Petty as for Hobbes the paradigmatic form of reasoning or "ratiocination" was mathematical:

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[293] BL MS Add. 72898, ff.118-119; printed in *Petty Papers*, 1:150.

[294] "Jesus is the Son of the Living God" (c.1680s), BL MS Add. 72887, f.52.

[295] In "Hindrances of the possible greatness of the Crown of England" (c.1687), BL MS Add. 72866, f.164.

[296] This seems to be the point of the title of "An Essay to make Military Questions Demonstrable", in *Petty Papers*, 2:62-70.

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> *Reason* is onely the addition [or] subtraction of *Sensata*; like the composition of printer's letters, whereby out of a few characters infinite descriptions are made, and as out of generall elements infinite Theorems are deduced.[297]

It is worth recalling, too, the circumstances of Petty's acquaintance with Hobbes: the two studied anatomy and optics, and moved in the midst of a circle of prominent natural philosophers and patrons many of whom were also prominent royalists.[298] Politics and anatomy were constant companions in Petty's Paris of 1645. Whether or not this provided a channel for the transmission of specifically chymical concepts is less clear.

Another route of inquiry is suggested by Hobbes's assertion that "in what matter soever there is place for *addition* and *subtraction*, there is also place for *Reason*."[299] At the end of the 1650s, Petty's taste for "Arithmeticall proportions, reducing Politie to Numbers", according to Aubrey at least, made him the bane of Jamas Harrington's "Rota Club."[300] In 1662, John Graunt's *Natural and Political Observations upon the Bills of Mortality* reduced the English polity to numbers as never before.[301] Graunt dedicated the *Observations* to the then Lord Privy Seal and future Lord Lieutenant of Ireland,[302] Lord Robartes, in the belief

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[297] "The Explication of 12 Theological Words" (1686), BL MS Add. 72898, ff.128-131; printed in *Petty Papers*, 1:165. Compare Hobbes, *The Elements of Philosophy* (London, 1656), I.i.2: "all Ratiocination is comprehended in these two operations of the minde, Addition and Subtraction."

[298] See Aubrey, *Brief Lives*, 237, and Chapter 1 above.

[299] Hobbes, *Leviathan* (London, 1651), I.v.

[300] Aubrey, *Brief Lives*, 240.

[301] John Graunt, *Natural and Political Observations Mentioned in a following Index, and made upon the Bills of Mortality* (London, 1662). A facsimile reprint of the 1662 edition appeared, together with Gregory King's 'LCC Burns Journal' (see Chapter 6, below) in 1973: Peter Laslett (ed.), *The Earliest Classics: John Graunt and Gregory King* (n.p., 1973). Petty edited and expanded the fifth edition of

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> That it doth not ill become a *Peer of the Parliament* or *Member of his Majesties Council*, to consider how few starve of the many that beg: That the irreligious *Proposals* of some, to multiply people by *Polygamy*, is withal irrational, and fruitless: That the troublesome seclusions in the *Plague-time* are not a remedy to be purchased at vast inconveniencys,[303]

in short, that a knowledge of what proportions of different groups of people lived and died in certain circumstances might help decisions about whether or not to act to change those circumstances or to deal with those groups of people. Frustrated that the mortality bills were mostly used "as a *Text* to talk upon in... Company" or "in the *Plague-time*... so the *Rich* might judg of the necessity of their removal", Graunt "thought that the Wisdom of our City had certainly designed the laudable practice of taking... these Accompts, for other, and greater uses,"[304] which he resolved to discover. In Baconian fashion Graunt first sought "to furnish my self with as much matter of that kind" as possible, creating tables of data "so as to have a view of the whole together, in order to the more ready comparing" of numbers from different places and times. At last,

> finding some *Truths*, and not commonly-believed Opinions, to arise from my Meditations upon these neglected *Papers*, I proceeded further, to consider what benefit the knowledge of the same would bring to the World[.][305]

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the *Natural and Political Observations on the Bills of Mortality* (London, 1676), which is reprinted in Hull's edition of Petty's *Economic Writings*. See Chapter 1. Page references are to the edition of 1662 and parenthetically (where appropriate) to the reprint of the fifth edition as printed in *EW*.

[302] In 1669-1670.

[303] Graunt, *Natural and Political Observations*, epistle dedicatory to Lord Robartes (*EW*, 320).

[304] Graunt, *Natural and Political Observations*, 1 (*EW*, 333).

[305] Graunt, *Natural and Political Observations*, preface (*EW*, 334).

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Graunt's work might be said, in Petty's terms, to have made population intelligible, and demographic questions – and their policy implications – demonstrable. More specifically, from the point of view of Petty's later work, Graunt made demographic *proportions* visible as realities located somewhere between nature and policy: some occurred naturally and could not be permanently altered; others did not. In *Political Arithmetick*, Petty would evaluate French and English naval policies in terms of whether they worked with or against Nature as expressed in "situation"; here, Graunt made similar evaluations in terms of Nature (or Providence) as expressed in terms of demographic proportion. In Chapter VIII, for example, Graunt observed that males in a population tend to exceed females by a ratio of 13:12. According to Graunt, this showed

> That Christian Religion, prohibiting Polygamy, is more agreeable to the Law of Nature, that is, the Law of God, than Mahumetism, and others, that allow it: for one Man his having many Women, or Wives, by Law, signifies nothing, unless there were many Women to one Man in Nature also.[306]

The demographic paradox that promiscuity and fertility were inversely related (an old idea) proved the truth of Christianity in exactly the same way that France's lack of natural ports proved the foolishness of her attempts at naval dominance.[307] Like Petty, Graunt accomodated his conception of "nature" to the effects of human policy: only if

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[306] Graunt, *Natural and Political Observations*, 44 (*EW*, 374).

[307] A similar though not identical argument about the effects of "Saracen" polygamy on multiplication had been made centuries before by William of Auverge, while in the 1250s Bonaventure had speculated about the sex-ratio; see Peter Biller, *Measuring the Multitude: Population in Medieval Thought* (Oxford, 2000), 87, 92.

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there were some relationship between them could policy be evaluated in terms of nature. Wars, and indeed even university regulations, were part of God's plan as revealed in His relative distribution of the sexes:

> So that although more Men die violent deaths than Women, that is, more are slain in Wars, killed by Mischance, drowned at Sea, and die by the hand of Justice; moreover, more Men go to Colonies, and travel into Forein parts, than Women; and lastly, more remain unmarried than of Women, as Fellows of Colleges, and Apprentices above eighteen, &c., yet the said thirteenth part difference [by which men outnumber women] bringeth the business but to such a pass, that every Woman may have a Husband, without the allowance of Polygamy.[308]

From one point of view, this was Providence making allowances for human behavior. From another perspective, by no means inconsistent, that extra thirteenth was a resource for policy: whatever happened to it, the demographic balance was maintained. Graunt's concern had been to combat polygamy by arguing that the demographic proportion between men and women made it unnatural, but his work may very well be the source for Petty's much more audacious use of much more freely defined proportions.

By the early 1670s, Petty was familiar both with a range of chymical concepts and practices and with the idea of applying mathematics to political and demographic questions – and, further, applying demographic information to questions of policy. The latter seems more prominent in his discussions of political arithmetic with Robert Southwell; consider the following account (actually addressed to Robert's son Edward), humorously grandiose even by Petty's standards:

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[308] Graunt, *Natural and Political Observations*, 45-46 (*EW*, 375).

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> Archimedes had Algebra 1900 yeares ago but concealed it. Diophantus had it in great perfection 1400 yeares since. Vieta, DesCartes, Roberval, Harriot, Pell, Outread, van Schoten and Dr. Wallis, have done much in this last age. It came out of Arabia by the Moores into Spaine and from thence hither, and W[illiam] P[etty] hath applied it to other then purely mathematicall matters, viz.: to policy by the name of *Politicall Arithmetick*, by reducing many terms of matter to terms of number, weight, and measure, in order to be handled Mathematically.[309]

Petty often acted as a sort of avuncular mathematics tutor to the Southwell children; his Christmas letters included mathematical puzzles for the amusement of "Neddy" Southwell and his sisters.[310] It is not surprising that, in writing to Southwell's bright young son Edward, Petty should stress the mathematical character of political arithmetic, which was, in print, largely a matter of demographic observations. But political arithmetic, in manuscript, was Ireland's "political medicine", and crucial to that medicine was a transmutation that went beyond simple numbers.

At some point the mathematics and the chymistry of demographic proportion came together. Exactly how or why they did so at first (whether in Petty's head or in papers no longer extant) is very hard to pin down. But *when* they came together is much easier to say. A set of "Severall observations beeing an Estimate & briefe view of the power and wealth of the Kingdomes of England, France and the States of the Seven United Provinces compared with each other" dated to c.1671[311] – that is to say, around the same time Petty wrote the first manuscript proposals for what became

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[309] Petty to Edward Southwell, 3 November 1687, in *Correspondence*, 321-322.

[310] See for example Petty to Southwell, ? December 1685, in *Correspondence*, 178-179.

[311] BL MS Add. 72865, ff.29-49; Petty's preamble and observations 44-136 are printed in *Petty Papers*, 2:226-239.

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transmutative political arithmetic – seems to mark Petty's first application of chymical metaphor to politics. Interestingly, it refers specifically to Graunt's earlier work:

> Having observed how many useful Truthes were lately distilled out of dry Bills of Mortality, I have furnished a more juicy matter to the Assembly of Reason; and I believe there is Salt, Sulphur and Mercury in every one of these 100 Observations, and that from them by due processe may be made the Laudanum of peace, and Elixir of plenty, and the Mercury of our Unsettlement fix'd.

The "Observations" included much of the same kind of information about land distribution and trade that would wind up in *The Political Anatomy of Ireland* and the comparisons of English, Dutch and French "situation, trade, and policy" *Political Arithmetick*, besides some of the mathematical observations developed in the *Treatise... Concerning the Uses of Duplicate Proportion*. Most of these were one or two sentences in length. But the last three, numbers 135, 136, and 137, were longer. The first was a set of comments on the Irish rebellion of the 1640s – how many killed, how many exiled, how many in arms, and how much property damaged. The second, 136, was a detailed breakdown of the English population (estimated at six million) by sex, age, trade, and social status. The last took one of the categories from 136, "Landed men", and broke it down in a similar way.[312] In this paper political anatomy, political arithmetic, and chymical metaphor came together. Shortly after this, Petty began to discuss "the transmutation of the Irish into English".

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[312] *Petty Papers*, 2:237-239.

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Conclusion

When Petty wrote repeatedly about "transmuting" the Irish through "proportionable mixture", he was not using an idle metaphor. He chose these words deliberately, stuck to them consistently, and was clearly as aware as anyone of their technical, chymical significance. He first began using them, indeed, in the midst of less carefully worked out but much more obviously chymical language – the sulphur, salt and mercury of his political observations. In fact, it seems to have been precisely the technical significance of mixture, transmutation and union that appealed. Petty's project for solving Ireland's problems – "the Mercury of our Unsettlement" – was not only bold, but highly idiosyncratic; it violated some of the most basic principles on which even those earlier writers on Ireland that Petty cited approvingly had relied.

The idiosyncracy of Petty's ideas was intimately related to the idiosyncratic way he expressed them. Petty's idea of transmutation through mass counter-transplantations and intermarriage developed at just the same time as he began to use the language of transmutation and affiliated chymical concepts in his discussion of politics. Petty's chymical idiom did not merely distinguish his projects from the hundreds of others that preceded and followed; it was what made such a distinct project conceivable in the first place. The task of governing Ireland could not be literally chymical, of course. But the mixture Petty sought was very real, and was quite literally attuned to the proportions of different elements in the population. Petty's ability to see politics, and bodies politic, in alchemical terms made possible a political program for which no political theorist furnished the words: a program that broke populations down into elemental subgroups, and then moved, separated,

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combined and mixed these groups in different amounts to produce a new, and better, body politic.

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4: Political Arithmetic in Circulation

William Petty invented political arithmetic between 1671 and 1675. Such a statement is an oversimplification, but it contains an essential and problematic truth: political arithmetic did not exist before Petty wrote it, and almost as soon as there is evidence that he used the phrase, there is also evidence that he attached it to an increasingly comprehensive and coherent program. When others began to write what they called political arithmetic – however different it was from Petty's – they universally acknowledged him as its creator. Of course, his ideas had intellectual antecedents: notably in Elizabethan and Jacobean writing about Ireland, but also in elements of earlier writing on trade or other economic topics, in the Baconian "improvement" literature of the Hartlib circle, and in the mechanical philosophies of Descartes, Mersenne, and Hobbes. Yet few of these sources would have recognized transmutative political arithmetic as an intellectual heir. With the partial exception of the aforementioned literature on Protestant plantation in Ireland, these antecedents provided a backdrop or a framework of thought, but little positive content and no specific agenda for action. Political arithmetic, as and when Petty wrote it, was bound up – as Petty was – with the British and especially the Irish political situation in the 1670s and 1680s. Then and for a long time afterward, it was no less closely bound to Petty's name.

Yet though Petty was, in his own lifetime, political arithmetic's sole practitioner, he did not practice it alone. It was, after all, a political program, designed to solve real problems and promoted as such among a necessarily select but

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unquestionably important audience. The task of the present chapter is to furnish a sort of social history of political arithmetic in the 1670s and 1680s, to the extent that it became social – to follow the paths of its dissemination, insofar as this is possible, to see the circles in which it moved. To do this means setting aside the printed corpus of Petty's works that crystallized years after his death, and looking instead at the manuscripts Petty wrote and what he did with them. The scribal publication of political arithmetic – the form and content of the manuscripts Petty wrote, and the shape of the network of friends, contacts and potential patrons through which these papers moved – was essential to its nature and aims.

Petty on Petty

> I do not reckon all my right and reasoning to be worth a straw, till I can get some powerfull person to consider it. I compose curious peeces in Music and play them accurately; but all this while my hearers are as deaf as haddocks, nor will their eares (I feare) ever be opened with just applications, till Wee run a Spit into them made of some convenient Metall.[313]

Petty had a very high opinion of his own abilities, an opinion that was widely but not universally shared. As the above passage shows, he also developed over the years a strong and perhaps understandable sense of frustration with the limited attention and still more limited resources given him by potential patrons. He generally attributed his failure either to the unorthodoxy and originality of his own work, or to the corruption and stupidity of the circles in which he tried to promote it. Though obviously self-indulgent, both of these opinions probably had something to them.

[313] Petty to Southwell, 2 August 1681, in *Correspondence*, 91.

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Petty's opinions on religion, in particular, were undeniably bold at a time when boldness in religion could be a dangerous thing. To the extent that political arithmetic was bound up with opinions on toleration, comprehension, and even quite specific doctrinal matters, then, Petty's concerns ("shew not these things but where you are sure of Candor and Safety", he wrote to Southwell in 1677[314]) seem justified. This is one reason why so much of Petty's political-arithmetical production is in the form of brief, sometimes cryptically sketchy, manuscripts. Politically sensitive material, whether satirical poems or pamphlets or state papers, often remained out of print.[315] Nor, in matters to be decided by a few select, high-ranking people, as in the case of so many of Petty's and others' projects, would printing necessarily have made economic sense. These conditions, combined with Petty's tendency to see in virtually all his projects implications for the wealth and security of the state, go far towards explaining his mode of literary production.

Petty's opinion of his court audience, however, was never very high, and the mixed reception his work received served only to confirm him in it. He was always solicitous, but quickly defensive. Writing to the Earl of Anglesey about *Political Arithmetick* late in 1672, Petty noted that "I never was successfull in any Thing of this Nature", but stressed that "I am not wary of pursuing honest Intentions" and hoping that "perhaps some may have an Ear to heare" them.[316] A week later he wrote anxiously to John Graunt that "I never heard you say any thinge of the Politicall

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[314] Petty to Southwell, 4 August 1677, in *Correspondence*, 31.

[315] On manuscript publication in general, see Harold Love, *Scribal Publication in Seventeenth-Century England* (Oxford, 1993). On Petty's own use of "coterie circulation", see Harris, "Ireland as a Laboratory", 84-85.

[316] Petty to Anglesey, 17 December 1672, BL MS Add. 72858, f.73.

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Arithme[ti]ck, nor whether the world knows or accepts it &c."[317] Later, though, entrusting his translation of the 104th Psalm to Southwell for publication, Petty declined to print *Political Arithmetick* and remarked with characteristic self-pity,

> You know I have no Luck with my politicks. Slight Court tricks have advanced many men, but the solid study of other men's peace and plenty ruines mee.[318]

Earlier in the same year he had written to John Aubrey in a similar vein:

> As for the Reprinting the booke of Taxes [i.e. the 1662 *Treatise of Taxes and Contributions*] I will not meddle with it, I never had thanks for any publick good I ever did nor doe I own any such booke, As for that of Duplicate proportion [*A Treatise... Concerning the Use of Duplicate Proportion*, 1674], I take Mr. Lodewicks paynes to put that discourse into the real character to be an honour to Bishop Wilkins and myself, but doubt of its acceptance in the world.[319]

Petty was invariably disdainful but also keenly aware of his competitors for patronage, and was usually ready to admit that he lacked the necessary social skills for success at court. In this too, there was some truth.

Such pessimism never detracted from Petty's sense of the value of his own work, however, and it is worth noting that all of the above pronouncements, some of the darkest Petty made, date from the 1670s, while Petty was first working on political arithmetic but well before the burst of pamphlets he produced in the last days of Charles II and under James II. Even then, amid a flurry of criticism of his

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[317] Petty to Graunt, 24 December 1672, BL MS Add. 72858, f.78.

[318] Petty to Southwell, 5 October 1678, in *Correspondence*, 61.

[319] Petty to Aubrey, 29 May 1678, BL MS Egerton 2231, f.90.

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Discourse... Concerning Duplicate Proportion, Petty had the confidence or arrogance to write:

> As for Mens Cencuring mee, for not understanding mee, Tis a Signe of Enmity or Envy, for If I were a popular and belovd person, People would applause [sic] my writings the more, for their little understanding them. So the Report of the Council of Trade, so much Exploded & thought criminall by some, is now in every great mans Archives.[320]

Petty's disdain for "slight court tricks" was lasting, but his despair of his own chances at court fluctuated. He had some basis for confidence. He had, after all, made a successful transition from being a protégé of Henry Cromwell to an occasional invitee to Hampton Court or Windsor for conversations with Charles II and James II, both of whom showed a gratifying interest in his expertise and projects, and his Irish career in particular had given him numerous if not always reliable connections with officialdom. Each new political tide, in London or in Dublin, brought new hope.

Beyond the vagaries of Restoration politics, Petty's personal characteristics played an important role in shaping the reception of his work among higher-ups. His overbearing and under-informed performance as a judge of the Irish Admiralty Court, coupled with his abrupt departure from the post, can hardly have impressed other would-be employers.[321] It is also worth remembering that Petty's dealings with officials in Ireland and England were dominated most of the time not by his political arithmetic but, on the contrary, by the tangled web of litigation in which his Irish

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[320] Petty to Wood, 10 April 1675, BL MS Add. 72858, f.211.

[321] On this episode see Kevin Costello, "The Judicial Career of Sir William Petty, Judge of the Irish Court of Admiralty, 1676-1683", paper delivered at the British and Irish Legal History Conference, University College Dublin (July 2003).

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estates involved him, sometimes in more or less direct conflict with many of the officials from whom he might otherwise have sought patronage. Petty's correspondence, and much correspondence between other parties in reference to Petty, is littered with references to what was by all accounts a complicated, tedious, interminable business.

This was further complicated by the degree to which Petty's legal problems and his political projects were, or could easily seem, connected, for both revolved around the question of the Irish settlement; even at a distance of centuries it is not always easy to tell one set of interests from the other, distinct though they presumably sometimes were. In this sense, Petty was a victim of his own success. It may have been hard for anyone with his knowledge of or interest in settling Ireland to escape the same trap, but Petty never tried. In fact, he explicitly connected what we would be tempted to identify as professional with private interests. Sometimes this was with obvious humor, as when he writes to Southwell that, along with his philosophical work on the "Scale of Creatures", "I might write a Treatis and call it *The Scale of Devills*, studying whereabout to place the Farmers" of the Irish revenue, with whom he was involved in legal disputes.[322] At other times, however, there is a hint that Petty's philosophical and financial interests mingled all too freely:

> The world do feare and therefore hate that Things should bee tried by Number, Weight and Measure. I cannot bring the Farmers to any accompt.[323]

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[322] Petty to Southwell, 10 November 1677, in *Correspondence*, 38.

[323] Petty to Southwell, 4 October 1681, in *Correspondence*, 97.

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Perhaps, after all, it is not very surprising that someone with Petty's considerable intellectual capability should tend to develop theoretical justifications for his private as much as for his public interests. But this propensity to be right in all things at whatever cost did not endear him to many of the more practical people whose favor he sought.

Despite this, Petty consistently portrayed himself as a disinterested, if misunderstood and abused, servant of the public good. In late letters to Southwell Petty describes "my 53 chests of Papers containing the Epitomy of my services and sufferings", and proudly asserts that he was "never the Toole or Turne-Shovell of any Person or Party."[324] The pose of the noble martyr was one Petty often found congenial, even in rare moments of apparent modesty ("Surely I am either not Good enough or not Bad enough to live in this World!")[325]. He sent some of his poems to Southwell with the disclaimer that they "are cramd with a sort of dry matter, and describe the truth of things, but they all want the Flame and very spirit of Poetry." But he went on, warming to a theme that had begun self-critically:

> So also do my other proceedings want the Poetry of Craft, the Lying Flattery, dissimulation, base complacency &c, and therefore are unsuccessfull.[326]

Such professions, unattractive as they may be, reflect not only Petty's propensity for self-pity, but also, and more importantly, his sense of being both burdened with and

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[324] Petty to Southwell, 17 July 1686, in *Correspondence*, 220.

[325] Petty to Southwell, 28 April 1677, in *Correspondence*, 28.

[326] Petty to Southwell, 29 September 1677, in *Correspondence*, 36-37.

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uniquely equipped for a mission that was, politically speaking, a hard sell: the settlement of Ireland by means of a union of English and Irish.

> All I can say is that I meane well to the whole, and not ill to any person in particular. If it bee so taken, I am contented to be a martyr for my Country. Bee it how it will, I have the Vanity to think That no body else can handle this Important Matter in this way.[327]

Colleagues

His brief turn in the Admiralty Court aside, Petty never held a regular office in government after the Restoration. His connection with Henry Cromwell had little to do with this; within two years of the latter's downfall, Petty had been knighted by Charles II and enjoyed several apparently successful audiences with him. But no great project replaced the Survey, and no great patron seems to have stepped into the gap Cromwell left. Petty's enemies of the last years of the Interregnum – Colonel Hierome Sankey and Benjamin Worsley in particular – were now in trouble of their own, but his influential friends had gone as well; lawsuits against the Irish revenue farmers and the occasional run-in with Colonel Vernon, an enemy from the days of the Survey, set the tone for Petty's Irish experience during the Restoration.

By 1660, too, many of Petty's more historically celebrated intellectual relationships had lapsed: relations with the Hartlib Circle, particularly Benjamin Worsley, but also Boyle and Hartlib himself, seem to have been permanently poisoned by Petty's Irish triumphs; the Paris days were a fading memory and Hobbes's friendship seems to have been so too. The Royal Society replaced some of these relationships and renewed others, but Petty's contributions to early meetings

[327] Petty to Southwell, 3 May 1679, in *Correspondence*, 77.

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were peripheral to political arithmetic, and the meetings do not represent anything like an institutional framework for its development. Like many other Fellows of the Society, Petty seems to have done most of his work at home, by himself.

Political arithmetic, then, though designed as a science of government, was initially the project of a private enthusiast. Nevertheless, Petty had a number of important friends, below the level of potential patrons but possible channels for contact with them. These friends included Sir Robert Southwell, Samuel Pepys, Sir Peter Pett, Robert Wood, John Aubrey, John Evelyn and, more distantly, others like William Penn and Thomas Sheridan, various members of the Royal Society, and former colleagues from Oxford, Gresham College, and Ireland. To group these people as "colleagues" of Petty is slightly misleading, in that they did not work together and were not in any exact sense equals. But they did share certain interests, and they were more nearly equal with each other than any of them were with the group treated below as potential patrons. These were the people to whom Petty sent his manuscripts, among whom copies of them were exchanged, and who in many cases responded with comments and suggestions, sometimes passing them on to their own patrons for perusal. They form what there is of Petty's "coterie", and connect at the margins with higher, more influential circles.

The most important of these was Sir Robert Southwell, who was Petty's cousin by marriage after 1667, his most regular correspondent from the mid-1670s on, and "at once his most intimate friend and his literary censor."[328] Southwell

[328] *Correspondence*, xii. Southwell (1635-1702) was a clerk of the Privy Council (1664-1679), twice envoy to the Portuguese court (1665-8 and again 1668-9), envoy extraordinary to Brussels (1671-2) and to Brandenburg (1680), and Member of Parliament for Penryn (1673 and 1679) and Lostwithiel (1685). Closely allied with the Duke of Ormond, he had been a moderate Tory under Charles II, but

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frequently interceded with the Duke of Ormond on Petty's behalf, in legal and political matters alike, though, it must be said, without managing to secure an office or very steady favour for Petty, whose intellectual arrogance and acquisitiveness seem to have alienated Ormond. But Southwell was much more to Petty than a door to greater things. From the historian's point of view, Southwell deserves the credit for the survival of so much of Petty's unprinted work; he collected Petty's ideas and drafts assiduously, passing them along but keeping copies for himself. He was the first archivist of the Petty papers: "It was Petty's habit to send to him almost everything which fell from his pen", and "[their] letters give the dates when many of these papers were written", valuable information not often evident from the papers themselves.[329] Southwell himself reminded Petty more than once of "that Ebony Cabinet wherein I keep, as in an Archive, all the effects of your Pen", and urged him to spend more time on his writing and less in litigation.[330]

Southwell was also, during Petty's lifetime, an important interlocutor, less on economic than on political, philosophical and religious questions. The two had a common interest in Ireland. Southwell's grandfather and great-uncle had been "undertakers" in the Munster plantation during James I's time, and while Petty, as a follower in the Cromwellian train, was from this point of view a "New Protestant", his views on the Irish settlement were closer to those of "Old Protestants" like the

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William III made him Secretary of State in Dublin from 1690. See Leslie Stephen and Sidney Lee (eds.), *Dictionary of National Biography*, 66 vols. (London, 1885-1901), 53:299-301; Toby Barnard, "Southwell, Sir Robert (1635-1702)", in *Oxford DNB*, 51:718-721.

[329] *Correspondence*, xii.

[330] Southwell to Petty, 15 September 1677, in *Correspondence*, 34.

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Southwells, who were long-time friends of the Duke of Ormond and his family.[331] (Petty, along with Vincent Gookin, had moderated the proposed settlement to allow royalist Protestants – like Ormond – in particular, as well as those Catholics who could, to demonstrate their innocence of the Irish rebellion and so to save their estates from confiscation.) All three had an interest in making the settlement work without unduly alienating Irish Catholics, and all three thought that with suitable adjustments to claims on all sides this was possible. Petty and Southwell exchanged numerous letters over the course of the 1670s and 1680s alluding nervously to threats to the settlement. Petty sometimes likened this to a ship,[332] proposing in April 1687 "That if wee had a dry dock, These few timbers [troublesome parts of the settlement] might bee mended without prejudice even to the mold of the present Hull."[333] Ireland was a mutual interest and a natural topic of comment between two cousins who owned Irish estates, and both seemed to share more or less the same view of things, which they only occasionally articulated – as, for instance, when commenting on the appearance of anti-settlement pamphlets. Rarely, therefore, do these exchanges throw very much light on political arithmetic, though the evident flow of papers from Petty to Southwell at least highlights the latter's place in its circulation. It was in a letter to Southwell (and not, as is often claimed, to Anglesey) that Petty first seems to use the phrase, and it is to Southwell that Petty's very last thoughts on the subject seem to have been communicated.[334]

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[331] Southwell's grandfather had been friendly with the Duke of Ormond's father; Southwell's father and Southwell himself with the Duke.

[332] See for instance Petty to Southwell, 22 May 1686, in *Correspondence*, 200-201.

[333] Petty to Southwell, 7 April 1687, in *Correspondence*, 267.

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More substantial are Petty and Southwell's discussions of religion and population, which often accompanied or followed on political-arithmetical papers by Petty touching one or both subjects. As in Petty's correspondence with Robert Wood following *A Discourse... Concerning the Use of Duplicate Proportion*, questions raised by regular readers like Southwell often led Petty to work on new problems, to clarify some of his claims, and to assess the nature of his commitment to them, though rarely to reconsider his position once he had taken it up. Petty and Southwell traded thoughts on Matthew Hale's and Edmund Halley's pronouncements on the origins of mankind and the history of the Flood, and Southwell was occasionally able to supply Petty with unfamiliar but useful material.[335] This sort of collaboration is most evident during Petty's work on the "Scale of Creatures", in the mid-1670s:

> As for the *Scale of Creatures*, I thank you for the paragraph you have sent me out of Dr. [William] Bates. You know I am no good book man, and therefore do not know what authors have written of this subject.... I desire you to enquire further what hath been written already; But whatever it bee, you shall shortly see mine, which will be an originall, although you should find the like hath been done a thousand times already.[336]

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[334] This is admittedly a minor point, but one that further illustrates Southwell's importance. *EW*, 239 n.2, gives a short history of Petty's use of the phrase, but locates its first surviving occurrence in Petty's letter to Anglesey, 17 December 1672 (BL MS Add. 72858, f.73), apparently (and a little surprisingly) overlooking his letter to Southwell dated ten days earlier. See Petty to Southwell, 7 December 1672, BL MS Add. 72858, f.58. Most subsequent authors, using printed sources, follow Hull's account. The way Petty uses the phrase in his letter to Southwell suggests that it was by then a familiar term, at least between the two of them: "I have a world more of Politicall Arithmethik".

[335] See Matthew Hale, *The Primitive Origination of Mankind, Considered and Examined According to the Light of Nature* (London, 1677). Petty's "Scale of Creatures", never completed, was designed as a comparable work. Southwell told Petty of Hale's book before it was printed and may have supplied him with passages from it (see Southwell to Petty, 2 January 1676/7, in *Correspondence*, 12). Petty commented on it in several letters to Southwell: see especially Petty to Southwell, [December 1677] (*Correspondence*, 44-48).

[336] Petty to Southwell, 3 April 1677, in *Correspondence*, 23. The work referred to is probably William Bates's *Considerations of the Existence of God*, first published in 1676.

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Few passages so neatly sum up their literary relationship; but it seems to have continued and even deepened over the remaining years of Petty's life – and despite, or perhaps because of, the occasional disagreement. In 1685 a long exchange about the desirability or otherwise of an increase in population brought out several long letters from Petty on "full peopling" that emphasized not only its economic benefits but its place in the progress of the history of the world.[337] A running commentary, often very amusing, on the education of the young Pettys and Southwells fed into a critique by Petty of a paper by Pascal that Southwell sent him, which in turn led Petty to make some of his clearest statements on education.[338] Southwell's interest in Petty's thoughts on religion led the latter to come up with a brief catechism and plan of Bible study – Southwell used it to teach his children, Petty as the basis for a comprehensive scheme of national worship.[339] It is difficult to overstate the

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[337] See *Correspondence*, 143-147, 150-155, 160-168, 171, 173-176. Petty was most insistent that "the speedy peopling of the Earth... tends greatly to the honor of God and the benefit of all mankind" (Petty to Southwell, 19 September 1685, in *Correspondence*, 153). As evidence of the first, Petty claimed that full peopling would, first, make clear that God made the Earth for man's use; second, encourage the knowledge of Gods works, since science flourished among concentrated populations; third "that God's first and greatest command to man and Beast was *to increase and multiply to replenish the Earth*"; and fourth, "That the world shall not be destroyed, nor the Day of Judgement come till the whole Earth bee peopled", a point he made more than once (*Correspondence*, 154). As to benefits for mankind, Petty first reiterated the greater knowledge of God's works. Second, he pointed out that "The King of England hath a greater share of the unpeopled Earth... than most other Princes[.]" Third, "our Lands in Ireland may 12 years hence bee double in value to what they are now" (*Correspondence*, 155). It would be easy to think that the second set of reasons, and especially the last, were more seriously meant, But all the above resonances of "full-peoplng", including the apocalyptic, are represented in other papers.

[338] On Pascal, the education of the Petty and Southwell children, and the two fathers' attitude to the faculty of imitation in particular, see *Correspondence*, 148-149, 152, 157-159, 169-170, 173, 180-182, 187-198.

[339] Religion was a common subject in their letters, but see especially *Correspondence*, 172-174. On Petty's own beliefs see Chapter 5. Petty wrote the catechism in Latin and English; the English portion is printed in *Petty Papers*, 1:128-130. The original, "The Christian Religion of little Children" (1685),

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importance of Southwell's friendship and correspondence on the development of Petty's thought in the 1670s and 1680s – he was by turns Petty's research assistant, editor, literary agent, publisher and audience, and, all the while, his closest friend.

Southwell's position was unique, but a number of other friends and acquaintances served as important readers and contacts for Petty and for early political arithmetic. John Graunt, author of the 1662 *Natural and Political Observations... upon the Bills of Mortality*, was an old friend, a London tradesman and militia captain whose "shop arithmetique" had earned him a place in the Royal Society, and who had helped Petty gain his position at Gresham College in the 1650s.[340] By the early 1670s, however, Gresham College had "almost sunk"[341] and Graunt, too, had fallen on hard times, suffering apparently irrecoverable losses in the Great Fire in 1666.[342] Petty was constitutionally indisposed to be sympathetic, and Graunt's conversion to Catholicism aggravated this tendency. When Robert Wood asked after Graunt, Petty replied coldly: "Captain Graunt is now an open and zealous

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is in BL MS Add. 72887, f.13. In a letter to Southwell, 29 August 1685 (*Correspondence*, 142), Petty had earlier written that

> I think there needs be no formal Essay about what I hinted for reading the Scriptures, for (1st) We hold all equally canonized. (2) Tis Manifest that St. Luke and the Acts are the best History of Christ and the Apostles. (3) The Epistles of Peter, James, John and Jude, are stile Catholiq or Generall Epistles, directed to the whole world, and not to Particular Churches upon speciall occasions. (4) They do manifestly contain the whole Christian Doctrine. I only add that the 2 Bookes of the Chronicles is the like Epitome of the History of the Jewish nation and Church.

[340] C.H. Hull's introduction to Petty's *Economic Works* (in which the 1676 edition of Graunt's *Natural and Political Observations* is reprinted) provides a thumbnail sketch of Graunt's life (*EW*, xxxiv-xxxviii); C.G. Lewin's entry ("Graunt, John (1620-1674)") in the *Oxford DNB*, 23:375-377, summarizes what little is known in detail.

[341] Petty to Henry Ford, 13 October 1674, BL MS Add. 72858, f.173.

[342] See *EW*, xxxvii.

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champion for popery. Wherefore I have not so much Intimacy with him as formerly."[343] This may seem to impugn Petty's supposed tolerance, but his objection seems to have been more practical than principled, as he elsewhere elaborated:

> I converce lesse then formerly with Mr. Gra[u]nt, he having declared himselfe a Papist, & of a religion which I take to be both false and inconvenient.[344]

Petty scolded the unfortunate Graunt sanctimoniously:

> As for difference in Religion you have done amise in sundry particulars, which I need not mention, because yourself may easally conjecture my meanings. However wee leave these things to God & be mindfull of what is the summe of all riligeon, And of what is and ever was Trew Religion all the world over.[345]

Yet when Graunt died in 1674, it was reported that "Sir William Petty was conspicuous for his grief."[346] It is undeniable that Graunt had been an important figure in Petty's early career, and though Petty was constitutionally unsentimental,[347] he was not completely devoid of feeling. Graunt had certainly also played some part in the early circulation of *Political Arithmetick*, probably as a London distributor for the then-Dublin-based Petty, much as John Petty (his cousin) had acted in Dublin for

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[343] Petty to Robert Wood, 2 August 1673, BL MS Add. 72858, f.107.

[344] Petty to Holland, 23 August 1673, BL MS Add. 72858, f.111.

[345] Petty to Graunt, 18 January 1672/3, BL MS Add. 72858, f.82.

[346] See the old *Oxford Dictionary of National Biography*, 22:427-428.

[347] Southwell, stung by a distastefully cheerful letter of condolence on the death of his wife, remarked, "Cousin, you doe wipe off Teares at a very strange rate": Southwell to Petty, 29 May 1686, in *Correspondence*, 201.

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Petty, then in London, twelve years earlier.[348] A letter from Petty to Graunt sent December 1672 asked anxiously about *Political Arithmetick's* reception.[349] There is also a letter from Graunt to Petty, undated but probably from the early or mid-1660s, in which Graunt reported conversations he had had about Petty with Sir Robert Moray and, more interestingly, the Earl of Anglesey, so that he may have played a role in circulating Petty's name and ideas among people of some influence.[350] But Graunt himself did not live long enough to do very much more for Petty. His most important contribution to the project was probably intellectual.

Robert Wood's connection to Petty went back to their affiliation with the Hartlib circle, but considerably outlasted it. The two men were nearly the same age, had a number of common interests, and followed relatively similar paths early in their careers. Wood came to Ireland in 1656 as a retainer of Henry Cromwell, who was then Petty's patron and protector as well, but soon left to become a fellow at the short-lived Durham College. Like Petty he attended meeting of Harrington's Rota Club, and like Petty he was a Fellow of the Royal Society – though not until 1681. Wood returned to Ireland after the Restoration, initially as chacellor of the diocese of Meath and later as a revenue commissioner and finally accountant-general of Ireland, a post he held at his death in 1685.[351] Wood thus shared Petty's interest in Irish

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[348] Several letters from William Petty to John Petty from early 1660 illustrate this – see BL MS Add. 72858 ff.15, 18, 28, 29, 41, 43, 47.

[349] Petty to Graunt, 24 December 1672, BL MS Add. 72858, f.78.

[350] Graunt to Petty, n.d., BL MS Add. 72858, ff.126-127. Arthur Annesley is referred to as the Earl of Anglesey, which puts the letter in 1661 or later; Graunt was still evidently Protestant, active in the Royal Society, and possibly in a position to do Petty favours, all of which argues for a date before 1666. See *EW*, xxxvii.

[351] This summary follows the account in the *DNB*, 21:843-844.

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government and politics, and by the 1670s he was in a position Petty might have envied.

Wood's surviving correspondence with Petty – especially two dozen or so letters clustered in two periods 1672-1675 and 1680-1682 – provides the most important evidence of Petty's methods of literary production and circulation. Among other things, it contains a significant and relatively protracted exchange on the subject of Petty's 1674 *Discourse... Concerning the Use of Duplicate Proportion*, which Lindsay Sharp has examined, along with the *Discourse* itself, in considerable depth.[352] Outside of Petty's correspondence with Southwell this is one of the only instances in which Petty was forced to defend himself at length in intellectual terms, and Wood's criticism of some of his friend's philosophical claims was deeper and more persistent than anything in Southwell's letters; where Southwell was an admiring friend, Wood was a critical intellectual colleague.[353] The content of the exchange will be surveyed along with the *Discourse* elsewhere, but it is indicative of Wood's place in Petty's circle.

The first evidence of Wood's function as a contact, on the other hand, is provided by several letters from early 1672, around the time Petty was completing a

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[352] Lindsay Sharp, "Sir William Petty and Some Aspects of Seventeenth-Century Natural Philosophy" (D.Phil. thesis, University of Oxford, 1976). About twenty letters from Wood to Petty are in BL MS Add. 72850; copies of a few from Petty to Wood in BL MS Add. 72858. Petty also wrote a long defense of the atomic theory expounded in the *Discourse* in response to a letter by "L.M." (Thomas Barlow, Bishop of Lincoln) passed on to Petty by the Earl of Anglesey, attacking it as dangerous to religion. This letter is in BL MS Add. 72850, ff.252-255; Petty's response, addressed likewise via Anglesey, is in BL MS Add. 72850, ff.220-223. There is a somewhat briefer version of the latter in the Pepys Papers – see Bodl. MS Rawlinson A.185, ff.219-220. Pepys followed Petty's pronouncements on religious questions with evident interest; see below.

[353] This goes for their responses to Petty himself. When it came to passing Petty's proposals upward, in his case to Ormond, Southwell seems to have been rather more reticent.

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draft of *Political Arithmetick.* These letters, however, initially concern Petty's so-called "Treatise of Navall Philosophy", which was in reality, like so many of Petty's productions, not a book but a scheme, in this case a sort of prospectus or set of heads for a treatise on naval matters of all sorts, from shipbuilding to what Petty referred to as "Naval Oeconomy".[354] Wood wrote on January 6, 1672, thanking Petty for the "Treatise" as well as for an "other Treatise", which is not named; it could be Petty's 1662 *Treatise of Taxes and Contributions*, but does not appear to have been *Political Arithmetick.*[355] Three weeks later Wood wrote to say he had not yet shown Petty's papers to "my Lord", apparently meaning the Earl of Essex, then Lord Lieutenant of Ireland, but expected to presently.[356]

There is then a letter, puzzlingly dated 5 December 1671 (but Petty was in Ireland in 1671; a date of 1673-1675, while Petty was in London, would make more sense given the content), in which Petty seems to have hit the jackpot. Though the confusing date is frustrating, it seems that the work in question is probably the "Treatise of Navall Philosophy". In any case, the letter gives so vivid and amusing a picture of how Petty's connections sometimes worked that it is well worth quoting at length:

> I come just now from the Castle where I had opportunity of presenting your Duty to my Lord Lieutenant alone in his Closet, who asking how you did, I began to tell him what you were doing viz what you had written, what kind of Arguments you had used, & how you had designed to have concerned his Lordship in shewing the Treatise you

[354] Southwell's copy of "A Treatise of Navall Philosophy" is now in BL MS Add. 72854, ff.99-105. See Harris, "Ireland as a Laboratory", 87, for some interesting commentary.

[355] Wood to Petty, 6 January 1671/2, BL MS Add. 72850, ff.172-174.

[356] Wood to Petty, 27 January 1671/2, BL MS Add. 72850, ff.174-175.

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> had made to the King &c... That no body had yet seen it, but that I had permission to shew the Heads thereof (which was all I had) to his Lordship if he pleased to see them: He Answered, most gladly, & so I pulld out a copie I had taken of them, supposing he would desire to keepe it, which he read over with much greediness, crying out severall times Excellent things! rare! &c. and then fell to commend you, & asked what you would have him to do, whether to write to the King about it, or to send those Heads, or expect the Booke it selfe, (which he hoped you would let him see) or to send you a letter to give the King with the Booke? any thing he would do to promote that which he though tended so much to the public good. I replyed, I knew nothing more of it then what I had imparted to you Lordship from your letter, nor whether things were yet ripe for publication. He then desired me to remember him unto you, & asked shall we see him in Ireland againe? & when?[357]

As we have seen, Essex's enthusiasm for Petty ultimately paid off in the form of a judgeship in the Admiralty Court, a less than entirely happy ending. Nevertheless, the episode shows that manuscripts circulated among Petty's connections could bring him the attention and possibly the patronage of higher-ups, and that this, rather than traditional publication, may well have been Petty's goal.

On this point a brief digression is appropriate, to raise the more general question of the relationship between Petty's literary form and his intentions. It is telling that all the Lord Lieutenant can have seen of Petty's "Treatise of Navall Philosophy" was a prospectus; this is all that ever existed of the "Treatise". Wood had also shown someone referred to as "honest J.B." Petty's "naval scheme, which he tooke thankfully.... But (added he) when shall we see the Treatise of which you gave us the Heads?"[358] This sounds like a fair enough question, but it was in fact rarely

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[357] Wood to Petty, 5 December 1671[?], BL MS Add. 72850, ff.192-193v.

[358] Wood to Petty, 10 February 1671/2, BL MS Add. 72850, ff.176-177.

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asked of Petty and hardly ever answered. Frances Harris, Petty's most recent and most thorough archivist, has remarked on this phenomenon perceptively:

> [O]nce [Petty] had put down the broad outlines of an idea in manuscript they had the same weight in his mind (and in those of his admirers) as a completed and published work. He claimed for example that a Dutch book on naval matters which was 'infinitely cry'd up at Court' (probably Nicolaas Witsen's *Book of Building Ships* of 1671) did not contain a fraction of what was in his own "Treatise of Naval Philosophy", although the latter... existed only in a few pages of synopsis passed around in manuscript amongst his friends, who hoped that one day he might be persuaded to expand it.[359]

The "Treatise" was merely one instance of a larger pattern. Petty produced vast numbers of heads, few of which bear much resemblance to the small number of recognizable books he wrote. His hundreds of pamphlet proposals vary between skeletal lists and concise summaries, hardly ever longer than five or six pages, and more often half that. It would be slightly perverse to see them as no more than heads – unlike the "Treatise", which did at least purport to be the plan of a larger work, they are often essentially self-contained, and complete as they stand, however terse. But among their primary functions was one that they shared with sets of heads like the "Treatise", namely, impressing upon the relevant authorities a sense of Petty's ability, both conceptual and, potentially, administrative. This purpose was evidently just as well served in Essex's case by a brief set of heads that could be read in a few minutes as it would have been by hundreds of pages of tiresome detail. Petty was not engaged

[359] Harris "Ireland as a Laboratory", 87. A similar phenomenon surrounds Petty's mysterious machine for double-writing, an much-touted invention dating back to his Hartlib years. Hartlib and his associates pressed Petty for further details, but he remained suspiciously coy, and nothing ever came of it; see Hartlib to Boyle, 15 May 1654, in Michael Hunter, Antonio Clericuzio and Lawrence Principe (eds), *The Correspondence of Robert Boyle*, 2 vols. (London, 2001), 1:178.

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in an academic exercise; he wanted a job. The way forward was through "every great mans Archives", not through the libraries of all and sundry. Petty did not want to be known as the author of a great book on naval administration (or economic policy, or political demography), but to be a great administrator. It may well be that such heads were all he thought he needed.

Even where a more complete work did exist, Petty's contacts seem to have found it expedient to cut it up into digestible chunks for their elite audience. Here, too, a letter from Wood gives the best evidence. While *Political Arithmetick* passed whole, *The Political Anatomy of Ireland*, had to be broken up and served to Essex *à la carte*:

> Sir. H. Ford at his going for England left me with your Pol. Arithm. But under this promise or Injunction That I should give my Lord [Essex] a Copie, which accordingly I did fairely written not very long after, my Lord since told me he had read it over & with much satisfaction, commended your ingenuity & c. I then took occasion to tell his Lordship, You had since writ a Discourse particularly about Ireland [i.e., *The Political Anatomy*], That I had the first draught thereof by me, That I would if his Lordship pleased bring him the Heads of the Chapters, That if his Excellency pleasd to select any or have them all writ out for his reading he might, being then written in a fast hand not so legible. He desired I would do so & when I brought him the Heads, he chose out which he would have first, & when I carried them, he told which next &c so by degrees I wrot him out 7 or 8 chapters, not according to the order in the Anatomy but as he fancied. Thus he has already had those about the Rebellion, Future Settlement, Mony, Trade, Valuation of Lands &c. I though it was better to let his Lordship have them as he might digest them as well as I write them, then stay to have all together; & I believe he had had the whole before this but for my sickness; for what he had he seemed still to be desiring more. And thus your Politicall Anatomy was dissected.[360]

[360] Wood to Petty, 28 April 1674, BL MS Add. 72850, ff.202-204.

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Like Wood's earlier letter, this gives a rare view of the way Petty's manuscript publications were circulated and read. It also allows us to see the sort of labor involved in producing manuscripts for circulation. Like Southwell, Wood played a dual role as contact and as interlocutor, and both roles involved editorial and scribal work. Wood's editorial input is suggested by an earlier letter on *The Political Anatomy of Ireland*, wherein Wood offers Petty some advice on organization:

> If you cause the P. Anatomy to be transcribed againe, I thinke the Paragraff about the Chancellor would be well inserted in the Chapter of Government just before the Ecclesiasticall part, & would together with that of the mysticall Government richly embellish that chapter.[361]

It appears, though it is hard to be certain, that Petty followed Wood's advice.[362] In terms of circulation, both the numbers and the quality of copies seemed to be a constant concern.

> I have a[t] length got the Copy of your Report [i.e. "A Report from the Council of Trade... by Sir William Petty", 1673][363] from Sir Harry [Ford]... but cannot prevaile for the Polit. Arithm., only he tells me my Lord [Essex] has it & likes it, I tell him however you would not willingly be thus utterly bereaved of your children: which I see at present moves not: nevertheless courage! I can at worst bid faire for the supply of that loss, if it should prove so, out of a copy I scribbled in hast.[364]

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[361] Wood to Petty, 16 August 1673, BL MS Add. 72850, ff.198-199.

[362] Chapter VI of the printed version of *The Political Anatomy of Ireland*, "Of the Government of Ireland", mentions the Lord Chancellor (both with reference to the Court of Chancery and as responsible for the appointment of Justices of the Peace), the ecclesiastical government, and the "Internal and Mystical [that is, Catholic] Government of Ireland" in that order. See *EW*, 163-164.

[363] The "Report" was drawn up by Petty for Essex and the Irish Council. It was, in Hull's words, "but a summary of the unpublished Political Anatomy"; see *EW*, 212. Essex sent a copy to Arlington and Petty gave a copy to Pepys.

[364] Wood to Petty, 25 August 1673, BL MS Add. 72850, ff.200-201.

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The gratifying news of Essex's attention was apparently tempered with anxiety about the fate of the manuscript itself, and as the letter of April 28 indicates Wood recovered the one good copy, lent by Ford to Essex, only by promising to replace it with a new one – eight months after Petty himself had asked Ford to deliver it up to Wood.[365] Petty seems to have sent out one or two manuscripts at a time, trusting to each reader to transcribe what he wanted to keep or give away, and to keep the thing moving. This sort of coterie circulation avoided the potential political pitfalls, as well as the financial risk, of print, but only at a certain cost in terms of efficiency and control.

That it was worth the cost suggests that Petty had a very specific audience in mind that did not require print but did require dedicated friends like Wood. Although Wood's letters from 1680-1682 do not provide anything like the picture of his earlier letters, it seems that he continued to be an important agent for Petty.[366] Robert Hooke noted in his diary on 13 October 1678: "I gave Dr. Wood Sir W. Petty's paper ["The Improvement of Ireland"], he lent me Sir W. Petty's *Political Arithmetick.*"[367] And although letters from Southwell and Wood provide most of the evidence for Petty's manuscript publication, their letters consistently indicate that they were part of a larger circle. Wood's letters in particular mention Sir Henry Ford, who appears to have been the first one to bring *Political Arithmetick* to the attention of Essex, then Lord Lieutenant of Ireland. Like Petty, Ford was a Fellow of the Royal Society,

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[365] Petty to Ford, 23 August 1673, BL MS Add. 72858, f.111.

[366] Petty returned the favor, distributing copies of Wood's "Almonac"; see Wood to Petty, 14 September 1680, BL MS Add. 72850, f.284.

[367] Henry W. Robinson and Walter Adams (eds.), *The Diary of Robert Hooke, MA, MD, FRS, 1672-1680* (London, 1968), 380.

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though expelled in 1682 for letting his subscription fall into arrears. Like Wood, but more briefly, Ford was part of the Irish administration: Secretary of State under Lord Robartes during the latter's brief Lord-Lieutenancy in 1669-1670, he returned in the same capacity for a time under Essex.[368] It was during this time that Ford seems to have functioned as a contact for Petty and an agent for the circulation of *Political Arithmetick*; after "his going for England" in 1674 references to him ceased.

Another contact worthy of mention is Sir Peter Pett, who, like Petty, had been at Oxford in the late 1640s and was an original Fellow of the Royal Society (like Ford, expelled for falling into arrears in 1675). Pett had sat in the Irish Parliament in the 1660s, later became Advocate-General of Ireland, and was knighted by the Duke of Ormond. He was a natural contact for Petty and the two also seem to have been good friends. Their extant letters are few but chatty, Pett addressing Petty with good-natured ribbing as "Noble Sir William" and ending one letter "And so (as old Primate Bramhall was wont to end his letters) God blesse us."[369] It seems likely that many letters have not survived. The two exchanged poetry (their own and others'), sometimes of a distinctly lowbrow sort, as well as various projects.[370] In late 1682, for instance, Pett wrote that Hugh Chamberlaine had sent him and was shortly to send Petty a proposal for setting up a bank in London, and invited Petty to join them to discuss the matter over a drink.[371] In 1685 a letter from Pett describes their exchange of books:

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[368] *DNB*, 19:418-419.

[369] Pett to Petty, 28 July [1674?], BL MS Add. 72850, ff.196-197.

[370] The Petty Papers include three Latin poems on political arithmetic, at least one of which is by Pett: "Sir Peter Pett's Pindarick on the Politicall Arithmetic" (n.d.), BL MS Add. 72899, ff.60-61.

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> I here send you by Marke Pardo An Index (that I promised to Lend you) elucubrated by a Great Disciple of yours, & worshipper of the 2d part of your Politicall Arithmetic, calld your other Essay [i.e. *Another Essay in Political Arithmetick concerning the Growth of the City of London*, 1682]. ... I entreat you to send me by Mark Pardo your Copy of Sir Jonas Moore's Survey of the River of Thames & it shall be Carefully & speedily restored you.[372]

How and to what extent Pett functioned as a channel for Petty's proposals to those higher up is not clear from the surviving letters, though Mark Goldie has made a case for just such a relationship, at least under James II.[373] What is most significant is that Pett – like Southwell and Wood, and in contrast to Ford and Graunt – could and probably did continue to play a role in circulating Petty's manuscripts in the 1680s, when the bulk of them were produced. Pett in particular is a transitional figure here: as we shall see, he became an important exponent of political arithmetic in his own right.

Probably the last name worthy of much attention in the context of the circulation of political arithmetic among Petty's colleagues is that of Samuel Pepys, whose biographical details are very well known. Pepys definitely admired Petty's intellect, and seems to have sought out his opinions in particular less on naval than on intellectual matters, including religion, as well as on population. Pepys's enthusiasm for "Navy Oeconomy & Rules" may conceivably owe something to Petty's "Treatise

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[371] Pett to Petty, 10 [December] 1682, BL MS Add. 72850, ff.298-299.

[372] Pett to Petty, 11 July 1685, BL MS Add. 72850, f.302.

[373] Mark Goldie, "Sir Peter Pett, Sceptical Toryism and the Science of Toleration in the 1680s", in W.J. Sheils (ed.), *Persecution and Toleration: Papers read at the twenty-second summer meeting and twenty-third winter meeting of the Ecclesiastical History Society*, *Studies in Church History* 21 (1984), 247-273; see especially 266, 268.

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of Navall Philosophy" – Pepys thanked Wood for lending him a copy – but cannot possibly have owed very much.[374] On other matters, however, Petty was an acknowledged authority. Pepys's notes on religion include memoranda to himself such as "Consult Sir William Petty about the Number of Men in the World &c", "Remember Sir William Petty's Note of the suddaine Extra[ordinary] Growth of the sect of Quakers even to a Mericle", and

> Sir William Petty's saying seems to employ a great deale, that much the greatest part of all humane understanding is lost by our discoursing and writeing of Matters Nonsensically that is in Words subject to more Sences then one to the rendring disputations Infinite upon every proposition that can be made in any Science whether divinity, Law &c.[375]

Here, Pepys was getting Hobbes in the Petty version. Pepys's archive even includes "A Dialogue between A & B", an important paper by Petty on religious toleration, which Pepys endorsed as "Sir William Petty's Paper written at my desire & given mee by himselfe a little before his Death."[376] Pepys also had a copy of one of Petty's more important letters to Southwell on population, from 1681,[377] of the defense of his *Discourse... Concerning the Use of Duplicate Proportion* that Petty sent to Anglesey in 1675,[378] and of his 1676 "Report from the Council of Trade".[379] Direct evidence of

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[374] See Bodl. MS Rawlinson A.171, f.89; Pepys to Wood, 16 June 1682, Bodl. MS Rawlinson A.194 f.279. The doomed Pepys writes of Petty's "Treatise", "I am under so impatient a desire of possessing the rest."

[375] "Notes from Discourses Touching Religion", Bodl. MS Rawlinson A.171 ff.218-221.

[376] Bodl. MS Rawlinson A.171 ff.274-275; another copy is in the Petty Papers, BL MS Add. 72889 ff.11-12.

[377] Petty to Southwell, 20 August 1681, Bodl. MS Rawlinson A.178 f.71; the letter is printed in Lansdowne (ed.), 91-93.

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Pepys's role as more than simply a reader and admirer is harder to come by; but a letter from Petty written in September 1687 is suggestive:

> I am just now sent from Bath where the King will be on Tuesday for the papers in your hands. I blush to presse you for your perusal of them, & to make your Remarques with that friendly Severity you promised. As for the Truth in Matter of fact I am content to venture them at the peril of my Veracity & Reputation. But whether the King will be pleasd to have these Matters to be discussed & published, is beyond my reach. Those only can advise mee who converse much with him: I am sure I meene well, but that may not bee enough[.][380]

At this point Petty had three months to live, but was producing papers in political arithmetic at an incredible rate. The political situation created by James II's religious reforms and the resistance these encountered gave Petty's work a new urgency, but also seemed to create new opportunities for him. Pepys's involvement as a reader and advisor at this critical point, when Petty was at the height of his intellectual powers and appeared to be approaching new heights of influence over the king, argues for his inclusion among what might loosely be called Petty's "circle".

There are other figures whose activity in circulating Petty's ideas is more shadowy, in some cases at least due to a lack of sources. Thomas Sheridan, for instance, connected Petty to Tyrconnell, though the extent and nature of the material he passed along is not clear.[381] John Miller suggests that Sheridan had known Petty

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[378] Petty to Anglesey, 3 April 1675, Bodl. MS Rawlinson A.185, ff.219-220. This is a slightly shortened version of the copy in BL MS Add. 72850 ff.220-223.

[379] See above.

[380] Petty to Pepys, 4 September 1687, Bodl. MS Rawlinson A.189, ff.17-18.

[381] Sheridan was Tyrconnell's secretary. See Petty to Southwell, 5 March 1686/7, *Correspondence*, 259.

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since the 1670s, and – as Petty may also have done – he played a behind-the scenes role in the Ormond-Anglesey-Castlehaven dispute of 1681-82.[382] Some played more peripheral roles, if not in Petty's life than at least in that of political arithmetic. John Aubrey thought of Petty as "my singular friend", and read his work with some enthusiasm.[383] He corresponded with Petty as well as with Robert Wood and even Thomas Hobbes on Petty's *Discourse... Concerning the Use of Duplicate Proportion*, but this was a matter of philosophical interest rather than potential patronage, and unlike Wood he did not attempt to enter the debate.[384] He later, more intriguingly, tried to interest Petty taking a share in the purchase of the island of Tobago, but this occasioned some meditations from Petty on population increase, and nothing more.[385] When it did come to the production and distribution of Petty's work, Aubrey seems to have thought in terms of print publication rather than manuscript circulation. Petty's response to Aubrey's inquiry about reprinting the *Treatise of Taxes* has been quoted above, and in answer to a similar query regarding *Political Arithmetick*, Petty told Aubrey:

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[382] John Miller, "Thomas Sheridan (1646-1712) and his 'Narrative'", *Irish Historical Studies* 20:78 (1976), 105-128. Miller writes that "Sheridan clearly took some of his ideas from Petty and apparently knew him: he took Petty's place among the revenue farmers in 1676 and at one point in his book used a technique for calculating the value of labour very similar to that set out by Petty" in *Verbum Sapienti*. On the Ormond-Anglesey-Castlehaven dispute, which I hope to investigate far more fully than has been possible here, see Chapter 5.

[383] See Aubrey's autobiographical entry in the *Brief Lives*.

[384] Petty to Aubrey, 29 May 1678, BL MS Egerton 2231, ff.90-91; Hobbes to Aubrey, 24 February/6 March 1675/6, Noel Malcolm (ed.), *Thomas Hobbes: The Correspondence*, 2 vols. (Oxford, 1994), 2:751-753.

[385] Aubrey to Petty, 17 August 1685, BL MS Add. 72850, ff.303-304; Petty to Aubrey, 22 August 1685, BL MS Egerton 2231, ff.95-98.

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> I am not forward to Print my Political Arithmaticke, but doe wish that what goeth abroad were compared with the Coppy in Sir R. Southwell's hand, which I corrected March 1679/80.[386]

Aubrey may have been part of the circuit along which Petty's political-arithmetical manuscripts moved, but he does not appear to have been a vital part. The same probably goes for the Royal Society in general. As we have seen, most of Petty's contacts (Southwell, Graunt, Wood, Ford, Pett, Pepys and Aubrey) were Fellows, but their dedication to and involvement in the Society varied greatly and none of their correspondence with Petty talks much about it. Their role in the Society, great or small, had little or nothing to do with their role in Petty's circle. There may have been a natural or socially probable coincidence between the two roles, but it seems clear that the Royal Society did not provide any sort of institutional home for political arithmetic. Instead, Petty's work moved through a network of individuals, usually officeholders and usually with Irish connections, who connected, or tried to connect, Petty and his work with influential potential patrons.

Patrons

However much can be said for Petty's coterie circulation of manuscripts, and however many fascinating exchanges of opinions his correspondence includes, any account of the early production and distribution of political arithmetic has to take into account one basic fact: it did not work. That is, Petty's proposals – and more-or-less direct petitions – did not lead to his appointment to any significant office (the

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[386] Petty to Aubrey, 12 July 1681, BL MS Egerton 2231, ff.92-94.

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anticlimactic judgeship excepted), and although political arithmetic did eventually achieve success as a way of talking about certain problems of government, it never became *the* instrument of government that Petty wanted it to be. This is largely due to the simple fact that British and Irish government in the 1670s and 1680s was too taken up with handling short-term problems to be susceptible to programmatic reform, and turnover of personnel and policies alike was too high to give much scope for potential reformers to act effectively. The history of Petty's search for patronage throws as much light on political circumstances as it does on political arithmetic, and his failure to find it reflects on both. The situation was too unstable; the program was too comprehensive; Petty himself, both personally and politically, too troublesome.

Petty naturally tended to pursue whoever was running Ireland. Ireland had given Petty his wealth and his first taste of administration, and Ireland's problems were the inspiration for most of his subsequent work. Though Petty extended political arithmetic to Ireland's sibling kingdoms across the Irish Sea, as well as to English colonies across the Atlantic, these were *extensions* of a program originally and fundamentally meant for Ireland. Petty's first real political patron had been Henry Cromwell and his first project the Down Survey, which furnished some of the foundations of the Cromwellian and subsequent Acts of Settlement. The rest of Petty's career and the beginning of political arithmetic were tied to the settlement of Ireland. Alterations in his proposals signalled changes in the politics of the settlement or in the attitude of his would-be patrons to it. This pattern will become clearer with reference to the proposals themselves later on; for now it will do to connect it to the political circles in which Petty floated them.

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When Petty began developing political arithmetic, in the early 1670s, Irish politics were in a state of flux. Arthur Annesley, since 1661 Earl of Anglesey, with whom Petty seems to have been on good terms, had been turned out of his Irish offices in 1667 as the result of a politically motivated investigation of Ireland's finances directed at the then-Lord Lieutenant, the Duke of Ormond, who lost his place himself two years later.[387] After Lords Robartes and Berkeley took brief turns at the job, the Earl of Essex was appointed Lord-Lieutenant in 1672, just as drafts of *Political Arithmetick* and *The Political Anatomy of Ireland* seem to have begun circulating via Wood and Ford. Petty enjoyed at least modest success with Essex; the latter showed abundant interest in Petty's work, got him to produce as a state paper a "Report" which summarized one of his treatises, and gave him a minor appointment. Petty did not revolutionize Irish government, but then his most revolutionary proposals were still years in the future. The Essex years might seem like a promising start.

While he courted Essex, Petty maintained contact with Anglesey. The two may have known each other from the dying days of the Protectorate, when both sat in Parliament; in any case both were major participants in the Irish settlement after the Restoration, and by that point they certainly knew one another.[388] Anglesey had been appointed in 1661 to the first of several commissions charged with enforcing the Act of Settlement. Ten years later, when yet another commission was formed to investigate the settlement, Anglesey was once again on it. In 1673 he was made Lord

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[387] See J.I. McGuire, "Why was Ormond dismissed in 1669?", *Irish Historical Studies* 18:71 (1973), 295-312.

[388] For this and what follows see *DNB*, 1:473-475.

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Privy Seal, apparently back in favor at court. A friendly figure with apparent influence over the settlement of Ireland, Anglesey provided a receptive audience for Petty's proposals. One of the earliest occurrences of the phrase political arithmetic, "whereupon I thinke depends The Politicall Medicine of that Country", is in a letter to him.[389]

Just as Anglesey was linked with political arithmetic at its inception, so he may have been connected with the explosion of pamphlets fifteen years later.[390] A dispute with Ormond in 1681-2 arising from the circulation of the memoirs of the Earl of Castlehaven cost Anglesey his position as Lord Privy Seal. This dispute, which centred on Ormond's role during the Irish Rebellion and Confederacy, touched off a series of histories important for their different justifications of and challenges to the settlement.[391] Despite this second fall from grace under Charles II, Anglesey recovered (while Ormond lost ground) with the accession of James, and in 1686 Anglesey was rumoured to be a possible replacement for Ormond as Lord-Lieutenant. He died too soon for this to happen, if it had been likely, but not too soon to provoke new hopes of influence among writers like Petty and Sir Peter Pett, who had adopted political arithmetic as "a therapy for national religious dissention" in England as well as for political and economic settlement in Ireland.[392] At the very least, this is a

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[389] Petty to Anglesey, 17 December 1672, BL MS Add. 72858, f.73.

[390] The following is based on Goldie, "Sir Peter Pett".

[391] On this dispute see Michael Perceval-Maxwell, "The Anglesey-Ormond-Castlehaven dispute, 1680-1682: taking sides about Ireland in England", in Vincent P. Carey and Ute Lotz-Heumann (eds.), *Taking sides? Colonial and Confessional Mentalities in Early Modern Ireland: Essays in honour of Karl S. Bottigheimer* (Dublin, 2003), 213-230.

[392] See Goldie, "Sir Peter Pett", for the whole argument. One possible problem is that the Ormond-Anglesey dispute put Southwell squarely in the Ormond camp (he wrote a counter-history to justify

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valuable suggestion of whom (besides his colleagues and, perhaps, James II) Petty's numerous writings on religion were meant to impress. It also links the first generation of political arithmetic with the project of religious toleration, indulgence or comprehension in the interests of political stability, confirming what the manuscripts very strongly suggest.

From the Restoration almost until the end of Petty's lifetime, however, the preeminent figure in Anglo-Irish politics was James Butler, first Duke of Ormond, scion of one of the greatest Old English families in Ireland, loyal defender of Charles I's cause there, and one of Charles II's most senior advisors during and after the Restoration. Ormond was Lord Lieutenant of Ireland twice. His first tenure, from 1661 to 1669, ended when he was brought down by the machinations of enemies in Ireland such as the Earl of Orrery, and by his association with the recently deposed Earl of Clarendon in England.[393] Like Clarendon, Ormond stood for the moderate enforcement of religious uniformity (though of Old English Catholic descent, he had been raised in the Church of England as a ward of the Crown). In Ireland, he sought an at least relatively equitable enforcement of the Acts of Settlement and Explanation, which punished only those Catholics guilty of rebellion and rewarded, if possible, only those Protestants not too blatantly guilty of it themselves. For both these reasons the more hard-line elements among the New Protestants of Ireland, led by Orrery, distrusted him. Ormond returned to office in 1677, but when, in 1685, James II briefly

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Ormond against Anglesey's charges; see Bodl. Carte MS 98), and there is no clear evidence that his relations with Petty cooled; but see Ormond's comments on Petty below. After Anglesey's death Petty wrote to Southwell that "My Lord of Anglesey's friends tell mee that his Lordship desired I should perfect his History of Ireland if he were snacht away," but that he himself would rather "'Let the Dead bury the Dead'"; Petty to Southwell, 5 March 1686/7, *Correspondence*, 260.

[393] McGuire, "Why was Ormond dismissed in 1669?"

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managed to unite Protestant dissent with the Catholic lobby in the supposed pursuit of religious toleration, Ormond's time was finally up.[394]

Petty seems to have begun courting Ormond's favour at the Restoration. In a letter of 1 March 1660/1, Petty enclosed "certain proposals for the improvement of Ireland", "an obscure draft of what I mentioned to your Lordship under the name of a Registry." The idea of a registry of lands (and later of people and property of all sorts) was a staple of Petty's proposals. What is interesting here is Petty's well-developed self-presentation as disinterested but well-informed and confident (after the Down Survey) that, given the right backing, he can solve Ireland's problems.

> I do not appear a projector to shark for my necessities nor because the newness of my thoughts hath intoxicated me, but because I have so often slept with them... as that I can hope to say some things soberly enough concerning my proposition. I should have presented this thing to your Lordship in gratitude... but I do it now because I know few hands besides your own from which Ireland will endure to receive any new thing. ... And as for debating the feasibility and usefulness of the thing, let it be done most publicly... for having 'scaped pretty well in several new proposals already, I have the courage to venture being laughed at once more.[395]

Nothing came of this proposal at the time, but given the confused state of Ireland and the settlement during the early 1660s that is not surprising. What is more surprising is that the next direct evidence on Petty's relationship to Ormond comes during the latter's second tenure as Lord Lieutenant, sixteen years later.

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[394] See *DNB* 3:504-512. Thomas Carte's massive, multivolume life of Ormond remains a major source not only for the Duke's biography, but also for the history of seventeenth-century Ireland in general.

[395] Petty to Ormond, 1 March 1660/1, in HMC, *Calendar of the Manuscripts of the Marquis of Ormonde, K.P. Preserved at Kilkenny Castle*. New Series, vols. 3-7 (London, 1905-1912) [hereafter HMC *Ormonde*], 3:11.

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If Petty's campaign for Ormond's attention failed in the 1660s, he had reason for optimism the second time around. In the 1660s Petty had failed to distinguish himself from the common run of projectors, despite (or possibly because of) his role in the survey and therefore in arbitrating the settlement. By the 1670s things had changed. In the intervening years he had enjoyed at least modest favour under Essex, and with his marriage to Elizabeth Fenton his circle of acquaintance among the influential seems to have widened considerably.[396] Of particular importance with respect to Ormond, Petty now counted Robert Southwell among his closest friends. But the difference was not only that Petty was better connected. It was also the difference made by the creation of political arithmetic. In his 1661 letter to Ormond Petty had offered a proposal for a registry. By 1677 he was thinking in much more comprehensive terms – not Irish projects but a program for Ireland. This difference is captured in an undated (but probably late 1670s) letter from Southwell to Ormond about Petty:

> I verily believe if hee be seconded by Authority in the method propos'd by him hee will be a great Instrument to make that Rocky Lawless places, that lyes now beyond Authority, to become English[.][397]

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[396] "Lady Petty" deserves far more attention than she has received in the literature on her husband. Her role in helping to manage Petty's Irish estates has been widely recognized, but her place in his literary production is, so far, a black hole. Sources are not plentiful for much of Petty's backstage life, and here the same applies; but they do exist. It is clear, for instance, that many of Petty's more important connections were really Elizabeth's, and that she played an active part in mobilizing them when needed. Petty's marriage may well have been as epoch-making for his career as, say, his time at Oxford was.

[397] Southwell to Ormond, n.d., BL MS Add. 72901, f.70. The letter, characteristically, asks for Ormond's help both with Petty's program and with his lawsuits: "if this Anxiety of his mind were over, he would be at leisure... to think of many useful things for the Publick." Southwell and Petty became friends around the time of Petty's marriage, and the letter refers to Petty as "a Kinsman", which puts it at 1667 or after. If by Ormond's "Authority" Southwell means that of the Lord-Lieutenancy, the letter must be from 1677 or later. I think 1677 likely.

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Ormond was initially receptive. After Southwell forwarded him a poem Petty had written to celebrate his reappointment as Lord Lieutenant, Ormond evidently gave Petty an encouraging audience, for Southwell wrote to his patron on 9 October 1677 thanking him (on Elizabeth's as well as Petty's behalf) for his kindness, and again stressing that "His talent is very considerable, and he has several admirers of it".[398] For his part, Ormond was "glad Sir William Pet[t]y is satisfied with my reception of him" and hoped that "I may have opportunity to advantage myself by his excellent partes & conversation."[399]

As time went on, however, Petty's excellent parts proved a source of some frustration for the Lord Lieutenant. The Popish Plot and its aftermath gave Ormond a lot of trouble, while giving Petty new inspiration – Petty's schemes grew grander just as Ormond's fuse shortened. Beyond that, the two simply had very different personalities. Ormond often lacked the patience and perhaps the intellectual curiosity to hear Petty out, while Petty could be intellectually domineering and lacked the ability to simplify or compromise his schemes enough to make them seem practicable in the short term. The comprehensive, programmatic nature of political arithmetic itself was, in Ormond's mind, its greatest problem:

> I do not wonder that a man of so fruitful an invention as Sir William Petty lets it loose now. It is most certain he has very many useful notions but they must for the most part be separated and singled out

[398] Southwell to Ormond, 9 October 1677, HMC *Ormonde*, 4:377.

[399] Ormond to Southwell, 20 October 1677, BL MS Add. 21484, f.11.

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> for practice and he bears not retrenchments either of land or of notions with much patience.[400]

Petty did, however, impress Ormond as "our best computer" in matters of population, and even when misquoting Petty's estimates the Lord Lieutenant cited his name.[401] In this respect, Ormond's reception of Petty marked the beginning of a pattern that second-generation political arithmeticians like Gregory King and Charles Davenant, and many later historians, would faithfully reproduce: ignoring Petty's purposes, but using (or arguing about) his numbers. In the relatively narrow realm of population estimates, Petty established himself as a recognized authority very early on.

But although Ormond used Petty as an authority on population, and continued to show interest in his ideas, he became increasingly critical both of Petty's accuracy (at least on matters other than population) and of the practicality of his program. Some of Ormond's criticism betrayed a personal impatience with pedantry bordering on anti-intellectualism, but much of it was doubtless fair: Ormond was, after all, trying to govern a difficult place at a difficult time. When he writes, apropos of the coinage debate, that "Sir Wm. Petty and Col. Lawrence have showed their skill in tumbling the argument of coins up and down, but with little edification to the hearers",[402] it is not hard to sympathize. Ormond was not operating, and had neither

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[400] Ormond to Southwell, 23 April 1679, in HMC, *Fourteenth Report*, Appendix, Part VII: *The Manuscripts of the marquis of Ormonde, preserved at the Castle, Kilkenny*, vols. 1-2 (London, 1895) [hereafter HMC 14th Report], 2:286.

[401] Ormond to Southwell, 8 November 1679, HMC 14th Report, 2:294. Here Ormond claims that Petty put the ratio of Irish Catholics to Protestants at 15:1, whereas Petty had said it was 8:3. Southwell wrote back to correct him: Southwell to Ormond, 18 November 1679, HMC *Ormonde*, 4:558. If nothing else this illustrates both the general ignorance of population statistics and Ormond's faith in Petty as a statistician.

[402] Ormond to the Earl of Arran, 17 April 1683, HMC *Ormonde*, 7:14.

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the time nor the inclination to operate, on Petty's level. He was not alone in this. Regarding Petty's project for licensing ale and liquor (a project encouraged by Ormond and the Earl of Rochester), the Earl of Arran struck a similar note:

> I confess I do not comprehend it well enough to give my opinion on the project, and am the less edified by his bringing Doctor Wood to me to explain and demonstrate the thing.[403]

Yet even Arran wound up convinced that Petty's ideas were good.[404] The problem was apparently more with his presentation of them than with their substance.

There was also the considerable problem of Petty's endless absorption in lawsuits to do with his estates. This was a time-consuming distraction that Southwell, and, at certain moments, Petty himself, despaired of. It was also a major political liability that he would not let go. Even given much greater sensitivity, patience and intellectual modesty than he possessed, Petty would probably still have been handicapped by his legal troubles. In a letter to his son, the Earl of Ossory, Ormond offered some telling and credible criticisms of Petty's schemes and his potential in office:

> I send you herewith some notions of Sir William Petty's upon the subject [of Tangier, naval questions, etc.], but I omit his computations of charge because they are too much mistaken, and that we can have them more certainly elsewhere. I have no objection to Sir Wm. Petty's being a Privy Councellor, but that he will make so many objections and propose so many notions that much of our time will be lost in them; besides, till a dispute between him and the Farmers is over it will be highly inconvenient to have him there.[405]

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[403] Arran to Ormond, 28 November 1683, HMC *Ormonde*, 7:162.

[404] See Arran to Ormond, 19 December 1683, HMC *Ormonde*, 7:170.

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Three years later, with James II on the throne and Ormond on his way out of office, Petty was chasing down more promising figures – James, whom he had known for some time, and even the Earl of Tyrconnell, whose long campaign against the Irish settlement seemed now close to fruition. This final change of direction brought out a further feature of Petty that may have held him up: his apparent untrustworthiness and even disloyalty. Of course, anyone (and there were many) who had already survived the changes wrought by the Protectorate and then the Restoration could seem either mercenary or merely sensible, depending on one's point of view. But there seems to have been a particular streak in Petty – it surfaces in his relationships with the Hartlib Circle and with John Graunt – that was more than simple political self-preservation. Certainly Ormond was no political naïf, yet Petty's behaviour still struck him:

> Sir William Pet[t]y is not so very confident of the assureance given him but that hee thinks it prudence to secure himself by applications to men in power & if hee can not save all will try to save one.[406]

It may seem misguidedly romantic to pin the failure of a program of colonial governance on the vagaries of personal relationships. Yet two considerations should be borne in mind. The first is the extent to which Restoration politics generally – and Irish politics in particular – was a matter of personal relationships, at the highest levels at least. The second, more particular to this case, is the peculiar way in which

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[405] Ormond to Ossory, 16 June 1680, HMC *Ormonde*, 5:336.

[406] Ormond to Southwell, 27 October 1686, BL MS Add. 21484, f.64.

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the program of political arithmetic was bound up with the person, if not the personality, of Sir William Petty. He was its progenitor and, before the later 1680s at the earliest, its sole practitioner. Until other writers took it up, its fate depended on Petty's ability to get himself heard by a very select group of individuals. Given all this, the importance of Petty's personal history may be seen in its proper perspective.

The last two names to add to the roster of patrons are those of Charles II and James II. Petty enjoyed occasional audiences with Charles from the Restoration on; he brought him papers to read, or read them himself. This might seem promising, but the heterogeneous character of the proposals Charles heard – everything from the improvement of Ireland to, most famously, the double-bottomed boat – sounds a cautionary note. It is probably not the case, as many historians have suggested, that Petty was no better than a source of amusement for Charles, the fate of the double-bottom notwithstanding.[407] But it is certain that Charles was a changeable man, and an occasional audience with him, while encouraging, meant nothing in policy terms, particularly for a man of Petty's relatively low standing.[408] Petty's own frustrations suggest that he was only too aware of this. The way to get things done was to go to the doers themselves – the Essexes and Ormonds. Charles offered prestige, but inaction.

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[407] See Petty to Sir Robert Moray, 29 November 1662, RS Letterbook P.1., ff.28-29, wherein Petty mentions "his Majesties kindness towards me (who was outwardly obnoxious enough, &c.)". Even the ridicule surrounding the double-bottom may have been exaggerated somewhat: Peter Pett, for one, wrote to Wood that Charles "doth often speak with... the... Commissioners of the Navy about Sir Wm Petty's Sluce Ship & doth not in the least ridicule it or play with it in his way of descant, but looks on it as an important invention, & so doth all the Navy board here." Pett to Wood, 27 November 1684, BL MS Add. 72894, f.46.

[408] See Miller, *Charles II* (London, 1991).

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James was a different matter. He expressed sincere interest in naval schemes, Petty's included, and later and more interestingly in religious toleration and projects for securing liberty of conscience. At the same time, his Catholic sympathies represented a serious threat to the Irish settlement, confirmed by his relationship with the Earl of Tyrconnell, and his support of Tyrconnell's Catholicizing policies in Ireland. As we have seen from the Pepys correspondence above, Petty secured at least one audience with James II at this crucial time. He is also known to have met with, and submitted proposals to, the Earl of Tyrconnell – once cautioning him to "have a care to lay good foundations fro the next settlement, which perhaps will bee called by your name."[409] The threat of Catholicization in Ireland and the opportunity for liberty of conscience throughout the Three Kingdoms ultimately led Petty to reorient his program considerably, to make it both relevant to the changed situation and palatable to James. Here too, Petty failed – he died in December 1687. At that point, political arithmetic ceased to be a program and became, instead, a language.

[409] Petty to Tyrconnel, 19 May 1687, BL MS Add. 72850, ff.163-164.

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5: Transmutations of Political Arithmetic, 1675-1687

The transmutative political arithmetic Petty produced in manuscript throughout the reign of Charles II followed the pattern that evolved over the years 1671-1675. The central focus was the "oeconomy of the family" in Ireland, which the exchange of English for Irish women, generally at the rate of about 10,000 per year,[410] would transform. In large part the forces of transmutation would move through apparently natural channels: women's roles in teaching language and otherwise educating children under seven years of age; in clothing and feeding the family; in directing the household.[411] The beauty of transmutation was this very simplicity; it "let Nature work" as soon as the right, laboratory-like conditions had been set up for Nature's processes to do the job of politics. A range of subsidiary proposals shored up this central plank. Perhaps the most obviously important of these was the replacement of the "wretched cabins" with English houses with chimneys and gardens – the sort of houses English women would live in.[412] But virtually everything Petty proposed for Ireland fit in somehow with this transformation of the household, from the replacement of Irish with English priests (even Catholics), to toleration, to

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[410] This is first suggested in Petty, *The Political Anatomy of Ireland*, 30 (*EW*, 158) and recurs in BL MS Add. 72879, f.75 (c.1675). Petty elsewhere indexes the numbers of women to be exchanged to estimates of the annual number of marriages among the poor Irish, with the obvious intent of ensuring that an English women take the place of every would-be Irish bride – see BL MS Add. 72879, ff.84-97 (dated August 1675). This may have been in his mind when he suggested an exchange of 10,000 women per annum, but a paper of March 1673/4 argues for fewer (7,000 per annum) on the strength of an estimate that there are 7,000 marriages annually among the poor Irish (who are in this paper estimated to number 700,000 in all; elsewhere, notably in *The Political Anatomy of Ireland*, this number is 600,000) – see BL MS Add. 72879, ff.71-72.

[411] See Petty, *The Political Anatomy of Ireland*, 31, 101 (*EW*, 158-159, 202-203).

[412] Petty, *The Political Anatomy of Ireland*, 30-31 (*EW*, 158-159); BL MS Add. 72865, ff.140-142 and ff.143-144; BL MS Add. 72879 ff.84-97 and ff.98-103.

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linguistic and education reform,[413] to the setting up of new manufactures, to political union.[414] Transmutative political arithmetic was a policy of civilization, the inverse of degeneration, that relied – as *Political Arithmetick* suggested – on the natural effects of an artificial situation. As Petty summed up at the end of *The Political Anatomy of Ireland*,

> *English* in *Ireland*, growing poor and discontented, degenerate into *Irish*; *& vice versa*; *Irish*, growing into Wealth and Favour, reconcile to the *English*.[415]

This was how the project stood in 1675, and given the relative density and consistency of political-arithmetical manuscript proposals to this point it is very frustrating that hardly any more proposals appear for another ten years. Whether, as seems fairly likely, this is because none have survived, or whether – which would be harder to explain – none were written, is impossible to know for certain. It is not very surprising that Petty should have redoubled his efforts, as he visibly did, with the accession of James II and especially with Tyrconnell's ascendancy in Ireland. But it is difficult, on the face of it, to see why they should have slackened so markedly ten years before. Petty's appointment as a judge of the Irish Court of Admiralty the following year is one possible explanation. For the first year at least, a great deal of his time was taken up learning the job (something he never really mastered but took some time to abandon) and struggling with the legal questions it threw at him. It may

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[413] BL MS Add. 72879, f.75.

[414] Broached by Petty in *Political Arithmetick*, 91-95 (*EW*, 300-302); *The Political Anatomy of Ireland*, 31 (*EW*, 159). In BL MS Add. 72879, f.75, Petty brings up the union of England and Wales, apparently to argue for a similar union with Ireland.

[415] Petty, *The Political Anatomy of Ireland*, 112 (*EW*, 210).

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be that he initially saw the appointment – reasonably enough – as a reward for the proposals he had already circulated, and a chance to implement at least certain aspects of them, in which case the fact that he stopped writing new ones becomes more comprehensible. It also may be that with Ormond's return to the Lord Lieutenantcy in 1677 Petty relied on Southwell to circulate what he had already written, and on his own ability to communicate with Ormond verbally, which he evidently had the chance to do.[416] On this account, Petty was happy with the ideas he had already put to paper and with circulating them in the form they already had by 1675, some examples of which certainly existed in multiple copies; he started writing again in 1685 in order to make changes. This is neither implausible nor conclusive. Most likely, not everything has survived.

In spite of this, examining what Petty did do in the late 1670s and early 1680s is helpful for understanding the meaning of transmutative political arithmetic in different political contexts, for this is when the first traces of Petty's thinking about the Atlantic world beyond Ireland appear. If we consider political arithmetic as an art of colonial government, the question of what it meant in the American colonies is an obvious one to ask. But the answer, as it turns out, is that although Petty readily applied political anatomy to New England and Pennsylvania, transmutative political was not appropriate. What is interesting is why this should have been so. If political arithmetic promised a way to manage the political problems posed by culturally distinct colonial populations by transmuting them into English populations, then New

[416] See Chapter 4, above.

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England in the era of King Philip's War, and Pennsylvania at the moment of William Penn's plantation grant would both seem ideal test cases.

Yet they were not, and the reason lies in the fact that, for Petty's purposes, the similarities between Ireland and the colonies mattered less than the differences, or, to put it another way, that for political arithmetic it was as important that Ireland was a kingdom as that it was a colony. Political arithmetic – designed after the Restoration by a student of Hobbes who, like Hobbes, had fled the Civil War – was meant to manage divisions between different kinds of people *within* a composite body politic. When Petty looked at the American colonies, he did not see such divisions. He saw only an embattled English colony, buffeted by threats (and perhaps threatened by temptations) from without. Here the task was not to facilitate transmutation of the natives, but to prevent that of the newcomers.

Petty's modifications to political arithmetic during the brief reign of James II are more direct and no less revealing. Unlike the problems of settling New England or Pennsylvania, the accession of a Catholic king to a Protestant kingdom exacerbated the very internal divisions political arithmetic was designed to smooth over. At the same time, new threats to the Irish settlement emerged, personified by Richard Talbot, Earl of Tyrconnell. As the two problems of the stability of the monarchy in England and that of English power in Ireland became increasingly intertwined, Petty's loyalties were divided between defending the settlement that was political arithmetic's original *raison d'être* and pursuing the policy of toleration that he had advocated for so long.

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In the end, he sacrificed the settlement less to toleration than to a sense of the inevitable. Watching Tyrconnell's rise and fearing the worst, he tried to win the Earl over with a compromise that would save political stability throughout the Three Kingdoms, and preserve the hope of union, however much it might cost the Irish Protestant interest or conflict with Petty's personal views. Alongside a fresh retrenchment of the settlement he proposed a new transmutation: not the Anglicization of the Irish, but the "Catholication" of the English. Petty saw this as the last hope of union, of political stability, and perhaps of the Stuart throne. Whether or not his answer was the right one, the events of 1688-1692 would confirm his fears almost verbatim. By then, however, he was dead.

Political Arithmetic in the Atlantic world

The foregoing account of Petty's development of political arithmetic has somewhat deemphasized his personal interest in Ireland: it was important, no doubt, but to argue, as some have, that it effectively determined his policy proposals and the methodological pronouncements with which he hedged them[417] is to oversimplify what was a very complex interaction between Petty's authorship, his background, his personal interests, his political beliefs, and his practical expectations. Nevertheless it is clearly his years in Ireland in the 1650s, and the personal and professional gain they brought, that made Ireland a natural focus of Petty's intellectual energies and the object of his political arithmetic. Political arithmetic was first and foremost an Irish program.

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[417] As does Mary Poovey, in *A History of the Modern Fact: Problems of Knowledge in the Sciences of Wealth and Society* (Chicago, 1998), chapter 3.

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Petty had no such interest in the American plantations. His concern with these was a logical extension of his involvement in the general questions his Irish proposals broached, only later a matter of some personal interest and never a matter of any professional consequence for Petty himself. For this reason if no other it is hardly surprising that Petty wrote very little on America; the little that he did write began later and is less well informed, less coherent and less specific than his Irish ideas even in their earliest stages. The main interest of this extension of Petty's thought, then, is the light it sheds on the principles behind political arithmetic, principles sometimes obscured by the specificities of the Irish situation in terms of which Petty's ideas were more often expressed. In this sense, however, it is revealing. Ireland's problems justified transmutative political arithmetic: they defined it from the inside. The problems of American plantation and settlement reveal outer limits of its application.

Petty's early attitude to the colonies in his surviving works was of a piece with his views on Irish plantation, on the one hand, and the importance of maximal population (a common concern of contemporary and earlier treatments of economic questions) on the other. Petty held, with the likes of Roger Coke, that England was under-populated and that the key to wealth and strength alike was "full peopling", which territorial expansion could hinder. But against Coke's and many others' arguments "that *Ireland* and the Plantations in *America*... are a Burthen to England",[418] Petty argued that colonies could promote the peopling of the mother country by supplying it with raw materials and an export market for manufactures, fostering industry in the metropole and encouraging immigration. In the *Political Anatomy of Ireland*, in fact, Petty thought that part of Ireland's own "fitness for

[418] Petty, *Political Arithmetick*, preface (*EW*, 242).

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Trade" was that it "lieth Commodiously for the Trade of the new *American* world; which we see every day to grow and Flourish",[419] while noting in the preface to *Political Arithmetick* that "the *American* Plantations employ four Hundred Sail of Ships" – a fact important not only as an index of trade but also because, as Petty went on to argue at greater length later in the book, it fostered the training of able seamen, one of the pillars of the commonwealth.[420] Successful colonies could increase the quality of England's population as well as its size.

It was not inevitable, however, that they would do so. Defending colonial plantation in populationist terms, as Petty tried to do, was something of a high-wire act, because it meant acknowledging that territorial gain was not the point of territorial expansion, but only a means to further ends contingent on a number of further factors; often lurking in the back of such defenses – and occasionally emerging, as in Petty's comments on Henry II's missed opportunity to resettle the Irish in England[421] – was a sense of regret that expansion had taken place at all. This was especially marked in writing on Ireland and New England, in the former case because of the high cost in "blood and treasure" of five centuries of English involvement – still without an adequate return or even the promise of long-term

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[419] Petty, *Political Anatomy*, 79 (*EW*, 190).

[420] Petty, *Political Arithmetick*, preface (*EW*, 243); see Chapter 2, above. It is worth noting that Petty did not see France's overseas empire as a way around the "natural and perpetual impediments" to her own naval development, as his comments about England's colonies seem to imply he should have – see *Political Arithmetick*, 51-63 (*EW*, 278-284). It may be that here Petty "rather made his Court, than spoke his Mind", as Charles Davenant would later suggest (see Chapter 6 below). But, following Petty's larger argument in the book, it may also be that English colonies were beneficial only *given* England's preexisting "situation", which predisposed it to develop shipping; France's colonies, if successful, might just encourage nations with a similar predisposition (the Dutch and perhaps the English) to trade with them, without significantly improving metropolitan France's situation.

[421] Petty, *The Political Anatomy of Ireland*, 29 (*EW*, 157).

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security – and in the latter because the colonists in New England were seen to have set up their own manufactures rather than depending on English exports.[422]

Petty himself acknowledged both points, though he could not completely agree with either of them as arguments against plantation in general. Ireland, though "from the yeare 1100, till within these 10 years... always a Burden and Charge to England,"[423] simply could not be relinquished, and might be finally settled through transmutation. In contrast, Petty seems to have seen Puritan New England less as an unsuccessful instance of territorial expansion than as an artifact of early Stuart religious policy – the very kind of unnatural policy Petty himself disparaged in *Political Arithmetick*. In neither case did Petty accede to what might be called the anti-colonial argument, but when Petty wrote neither Ireland nor New England was a particularly shining example of successful plantation.

Further, territorial expansion created its own problems – "contingent and removable" impediments, to use the language of *Political Arithmetick*, but impediments nonetheless. This was even, indeed uniquely true, of a maritime empire such as England was:

> The first impediment of *Englands* greatness is, that the Territories thereunto belonging, are too far asunder, and divided by the Sea into many several *Islands* and Countries; and I may say, into so many Kingdoms, and several Governments[.][424]

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[422] See Roger Coke, *A Treatise* (London, 1671); cf. Maurice Ashley, *Financial and Commercial Policy under the Cromwellian Protectorate* (London, 1962), 134.

[423] That is, until 1675; "Notes for a motion to be made in the Howse of Commons of England, concerning Ireland" (c.1685), BL MS Add. 72881, ff.87-88.

[424] Petty, *Political Arithmetick*, 87 (*EW*, 298).

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The most obvious and important divisions were those between the Three Kingdoms and between the two islands of Britain and Ireland, and it was these, and especially the latter, that transmutative union proposed to resolve. But throughout the English King's dominions, essentially similar divisions multiplied with each new conquest and deepened with each passing year:

> The Government of *New-England* (both *Civil* and *Ecclesiastical*) doth so differ from that of his Majesties other Dominions, that 'tis hard to say what may be the consequence of it.
>
> And the Government of the other Plantations, doth also differ very much from any of the rest; although there be not naturally substantial reasons from the Situation, Trade, and Condition of the People, why there should be such differences.
>
> From all which it comes to pass, that small divided remote Governments, being seldom able to defend themselves, the Burthen of protecting them all, must lye upon the chief Kingdom *England*; and so all the smaller Kingdoms and Dominions, instead of being Additions are really Diminutions[.][425]

As the history of Old English degeneration in Ireland (never far from Petty's or his readers' minds) showed, disaster could result if even the artificial differences occasioned by distance and isolation were allowed to develop unchecked. Conversely, the possibility of transmuting even Ireland highlighted the scope for future policy to undo the damage past policy had done to the imperial situation.

There seems to have been at least one important difference in Petty's mind between Ireland and the English colonies in the Atlantic: whereas His Majesty's English and Irish subjects in Ireland were divided by politics, custom and culture, all his Majesty's subjects – or at least, all the politically effectual actors[426] – in the

[425] Petty, *Political Arithmetick*, 88 (*EW*, 298).

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colonies across the Atlantic were English, at least for the moment. The task of good policy would not have been to transmute them, then, but simply to keep them from degenerating and requiring transmutation at some future time, by binding them more closely to the rest of the Empire and especially its chief kingdom, England. Whether this meant that Petty did not regard native Americans or Africans as subjects of the British crown, or whether he simply did not see them as (yet) a threat to the allegiance of the English colonists is not clear, but at any rate this is probably why Petty's only proposal for the Atlantic "dominions" in *Political Arithmetick* – in sharp contrast to his contemporaneous ideas for Ireland – was purely institutional and largely administrative: "making Two such Grand Councils, as may equally represent the whole Empire, one to be chosen by the King, the other by the People."[427] What had happened to prior English plantations in Ireland might happen in the other colonies if no action were taken, but it had not happened yet. In the meantime, in fact, dispossessed Irish landowners might themselves be transplanted to America, where they would presumably be less capable of making trouble.[428]

If this is the right way to read Petty's stress on "grand councils" and closer administrative ties rather than transmutation in his proposals about the wider "English

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[426] Petty makes no mention of Native Americans in *Political Arithmetick* or in any surviving paper dating to before 1675. Earlier in *Political Arithmetick* (84; *EW*, 296) he included "The value of the Slaves, brought out of Africa, to serve in our American Plantations" in a calculation of the total value of English trade, but he rarely if ever considered the slaves as people, either in the political sense or even (at least explicitly) as part of the population of the colonies.

[427] Petty, *Political Arithmetick*, 88 (*EW*, 298).

[428] In a paper dated to c.1675 entitled "Decrees and Judgments of one Island Executed in the Other" (BL MS Add. 72879, f.75) Petty proposed sending two-thirds of unsatisfied "divested" Irish landowners to America and the rest to Scotland.

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Empire" beyond Ireland,[429] then his opinion of the relative stability of the American colonies does not seem to have changed very much over the course of his life. Proposals for imperial administrative and representative institutions (and the line between the two is not a clear one in many of Petty's papers) proliferated through the 1680s. In "Of a Grand House of Peeres", Petty proposed expanding the English House of Lords to 520 members, "Of which 40 to be cald out of Ireland, 30 out of Scotland, and 10 more out of the rest of his majesty's Dominions in Asia, Affrica and America". This arrangement would have many benefits – a greater and more talented pool from which to draw ministers, for instance – but the main point seems to have been to unite colonial with metropolitan government both for its own sake and to create a body of loyal servants of the Crown "greater then that of the House of Commons in England (which is but 513) and greater then the number of any other Assembly within the King's Dominions."[430] A paper tentatively dated to 1687 proposing "a generall Councill for Plantation, Manufacture, Trade, Religion, and Applotment" sketched out a similarly broad elected body – and, similarly, swamped 45 Irish, 30 Scottish, and 11 colonial representatives ("3 for New England, 4 for Virginia, Carolina and Maryland," and one each for Jamaica, the Barbados, "Asia", and "Africa") in a sea of 364 English counselors (including one each for Jersey and Guernsey).[431]

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[429] In 1685 Petty was also making notes on the size and function of the contemporary English Parliament, not always approvingly (he noted in particular, in BL MS Add. 72866, f.14, that "That there is much tumult, disorder, and confusion, in many of the... Elections.") He may have seen a reorganized grand elected council as the answer to domestic as well as colonial problems.

[430] See *Petty Papers*, 1:8-9; the original is in BL MS Add. 72866, ff.7-10. Frances Harris dates it tentatively to 1685.

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From beginning to end Petty evidently thought that, absent the sort of cultural difference and numerical predominance that set the Irish apart, institutional reform would suffice to quell any incipient colonial insubordination. A 1687 "Table of Chapters" for a never-to-be-written work on empire indicated the shape of Petty's imperial vision. One chapter was to have shown "That for want of a Union, Even the Protestant and English of Ireland, may as it formerly hath done degenerate, bee estranged, and Rebell." So also for the more distant colonies. But as long as (or once, after the transmutation of the Irish) all his majesty's subjects were essentially English, this institutional union would serve the whole English Empire: "as Wales is an Example of the good Effects of an Union, so will Ireland bee, to Scotland, New England and the other of his Majesty's out-territorys."[432] In another paper written the same year Petty noted that

> The King of Englands Empire lyes in 4 parts. Viz His European Islands, His American Islands, His planted lands upon the Continent of America, And his African and East India-Trade.

The task of imperial government was not to expand these territories by further acquisitions but to fill them with people who would be more and more the same. "The

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[431] *Petty Papers*, 1:12-13; the original is in BL MS Add. 72866, ff.174-175. The Marquis of Lansdowne suggests that the paper was written "immediately after the Restoration" (*Petty Papers*, 1:4), based on the fact that a Council for Trade and another Council for Foreign Plantations was in fact established in late 1660; see C.M. Andrews, *British Committees, Commissions and Councils of Trade and Plantations, 1622-1675* (London, 1908), 67ff. However there is little relation except in name between the small, appointed advisory councils of 1660 and the large elected body Petty describes, and I have followed Harris's suggested date of c.1687. Incidentally, Petty's allotment of three representatives to New England and only one to Jamaica would seem to confirm that he did not view African slaves as part of the civil population of the King of England's dominions; see below.

[432] BL MS Add. 72885, ff.110-111 and ff.112-113 (two copies).

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Emprov'd Empire", paradoxically enough, would be a social and political unit, bound together by an English sea.[433]

Petty's interest in the Native Americans, who might seem to have presented the same problem for this vision as the Irish, seems to have developed only gradually; at first he seems strikingly blind to their existence – strikingly, because of what now seem obvious parallels between Ireland and the American colonies and indeed between some of his own later papers on the two. This may be because he did at first not see the non-English population as internal to the English dominions in the Americas; transmutative political arithmetic was meant to manipulate subject populations. A few pages of "Notes about New England. Taken 4 February 1674/5" during a conversation between Petty, a "Dr. Taylor", and two informants identified only as "Mr. Frost" and "Mr. Bartholomew", is remarkable for its nearly complete lack of reference to the American world outside the English settlements. It listed the names of nearly forty Massachusetts towns and the number of families in each and estimated that in all of New England there were 12,080 families, 100,000 "soules", and 16,000 "men fitt for armes". The document then moved on to shipping and to a short list of New England ironworks. There followed lists of the "Principall Merchants" and "Eminent Ministers" of the larger settlements, of "Rivers and Harbours on the Coast", of "Islands", "Men who have been actually soldiers" (very few and prominent), "Present Magistrates", "Merchants and others of London, Trading & Corresponding with New England", and further "popular men". Some of

[433] "Of the King of England his Naturall & Instrinsic power" (1687), BL MS Add. 72866, ff.148-151. This is the larger purpose behind Petty's preoccupation with *mare clausum* in many of his papers, and probably informed his sense of his role as a judge in the Irish Court of Admiralty.

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this matched up with Petty's contemporaneous concerns with situation and population, but on the whole the document is impressionistic even by Petty's standards, in part no doubt because of the limited knowledge of his two informants.[434]

Only with the closing "Miscellany observations" did some of Petty's more characteristic interests apparently emerge. These included notes about New England's imports from England as well as its home manufactures, the summer and winter wages of laborers and artisans, and further details about the militia, government and church settlement. Several of the observations related to crime, such as that "Adultery is Death by the Law, but scarce ever executed". There are "No Beggars in the whole Country", and "The poorest Houses have ground Roomes & Lofts, & most have Cellars." (Here the contrast with Irish households would have been obvious; in his 1673 "Report from the Council of Trade", written at Essex's behest and based on *The Political Anatomy of Ireland*, Petty had described "wretched nasty Cabbins... worse than those of the Savage *Americans*". The English in New England were, by comparison, maintaining tolerably English households.)[435] Petty commented that "The chief Transmigration was between 1631 and 1641" and, in line with Petty's advocacy of toleration, that "The Sectaryes at Road Island use extream Lyberty & live quietly enough." But the English population was his chief interest. The paper

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[434] *Petty Papers*, 2:98-105; the original papers are in BL MS Add. 72867, ff.47-58, and a shorter summary is in BL MS Add. 72867, ff.59-61.

[435] Petty, "Report to the Council of Trade", 116 (*EW*, 215); manuscript copies of the "Report" are in NA SP 9/2/2 and RS MS Classified Papers XVII, item 18. Hull dates the "Report" to 1676 (see *EW*, 213) but this may be based on a mistake in transcription; the copy in the Williamson pamphlet collection at the National Archives is filed under "1673", is dated "March the 25th, 1673" where Hull has 1676, and both it and the Royal Society Library copy refer to "your Lordship's Act of Council, of January the 20th [16]72 [i.e., 30 January 1673 New Style]" where Hull has 1675; assuming the manuscripts are correct early 1673 seems a likely date of composition. The comparison with "savage Americans" does not occur in *The Political Anatomy of Ireland.*

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noted in two places without further comment that "One Mr. Elliot [i.e. John Eliot] translated the Bible into Indian", and the only mention of the Indians themselves was to the effect that the English colonists "Invite the English to see them Muster in Armes, but never suffer them to handle Armes."[436]

A smaller, later set of "Some Remarques of the people of New England, drawne from Papers sent from Thence"[437] laid out a much more limited range of information more systematically, and may reflect a greater degree of selectivity and control on Petty's part than the earlier notes, based as they were on a conversation between four people. The paper included estimates of the size and distribution of the militia – relatively detailed in the case of "New England" (Massachusetts Bay and Plymouth), sketchier for Rhode Island, Connecticut and, under Connecticut, New Hampshire and Maine. It also contained more scattered observations on situation ("Not one Acre of ten or twenty in many places manurable" in New England), improvement ("The Estates [of Connecticut] amount to 110,788*l* St[erling]") and trade ("Commodities imported from England [to New England] may amount to forty or fifty thousand pounds yearly"). But other than this the preponderant focus of the short document was population and rates of growth and marriage – emphases recognizable from *The Political Anatomy of Ireland* and many of the political-

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[436] *Petty Papers*, 2:105-107.

[437] *Petty Papers*, 2:107-108. The paper is undated, but based on the inclusion of militia estimates for Connecticut for the year 1678, a date of composition of 1679 or later seems likely. In a letter to Southwell dated 10 September 1678, Petty asks claims his 'collections' on New England "contain more material truth than I have ever heard from others" (see *Petty Papers*, 2:95; Petty to Southwell, 10 September 1678, in *Correspondence*, 59); whether referring to the earlier or the later document this claim seems (albeit characteristically) overblown. It is always possible that papers have been lost, but the shape of Petty's interest in New England as late as 1679 is discernible through the foci of the surviving material.

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arithmetical proposals for Ireland Petty had written since – and for the first time, Petty made clear his definition of the New England population that concerned him:

> They account all generally from Sixteen to Sixty... fitt to bear Arms; except Negroes & Slaves whom they arme not. There are 500 Whites born there yearly & three hundred marriages. ... In seven years have been born eight hundred Whites. Four hundred and fifty marriages within the same time.

While in Rhode Island,

> Of Whites & Blacks (of the latter there are very few) about two hundred born in a year. About 50 marriages; about four hundred & fifty five Burials in Seaven yeares.[438]

Petty's lack of interest in the Native American population and his implicit exclusion of "Negroes & Slaves" from the effective English population may seem to cut against the grain of his contemporaneous absorption in the problems of Irish cultural difference elsewhere. This omission is all the more astonishing since the paper considerably postdates King Philip's War (1675-1676), an event that would have made anyone following the fortunes of New England well aware of the danger that other kinds of people posed to English settlement. It may even be just such an awareness that focused Petty's attention so consistently on the militia. The answer to this riddle seems to be that Petty did not see slaves as a political threat,[439] and that while he must have seen Native Americans as a threat, he did not see them as subjects

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[438] *Petty Papers*, 2:107-108.

[439] What he did think about the slave population and slavery generally (as distinct from the economic value of the slave trade, mentioned above) is impossible to know; no surviving papers provide comment.

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but simply as enemies. If we compare Petty's view of the English colonies in North America to his view of Ireland, the role played by the "savage Americans" is less like that of the "wild Irish" (rebellious subjects) than like the French (hostile potential invaders). The answer to any problem they posed was not transmutative but military: the exact opposite of the sequence in *The Political Anatomy of Ireland.* A rudimentary political anatomy of New England revealed a healthy English population threatened from without, rather than a sickly body politic torn by internal divisions. Political arithmetic was still a solution to Irish problems, problems New England, for all its own worries, did not share.

Whether and how far Petty ever changed this basic diagnosis is hard to say. What is clear is that at some point between 1679 and 1685 he began asking questions about Native Americans that closely paralleled those he had already asked about the Irish. One possible prompt was his own limited personal involvement in American colonization, which came about through his acquaintance with William Penn. Petty seems to have met Penn while in Ireland in the 1660s,[440] and the two shared interests in Irish plantation and in religious toleration.[441] In 1681 Petty's wife Elizabeth thought about purchasing shares in Penn's American colonial venture, but backed out at the last minute, and in 1686 Petty himself apparently purchased land in

[440] See *Petty Papers*, 2:95.

[441] A letter from Penn to Petty dated 30 July 1675 addressed the latter as "my old and worthy friend". Penn wrote that he had spoken with "the great man" (perhaps the Earl of Essex?) about Irish affairs, and added "I entreat thee most earnestly to have In writing what was read to me of England & Ireland.... Ireland took as well as England; now is the crisis; therefore pray fail not." It is possible that Penn was referring to either *The Political Anatomy of Ireland* or *Political Arithmetick* or both (Essex, for one, had received copies of both), but this is speculation; BL MS Add. 72850, ff.234-235.

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Pennsylvania through Penn.[442] In "An Agreement between Penn & Petty about a Colony in Pennsylvania",

> Penn doth devise to Petty, in Consideration of 5s., a quadrangular peece of Land Lying 12 English Miles upon the river of ____, and 6 1/2 miles broad upwards into the Land, forever; Yeelding & paying for the same one grayne of wheate yearely, together with one hundredth part of all Colts, Calves, Lambs & pigs, as also one hundredth part of all the Wheate, Rye, barly, Rice, Oates & pease, which shall bee gotten & produced out of the said lands forever. To be taken from time to time from & out of the said lands by the said Pen or his assignees, in the same manner as Tythes are now taken & Collected in England.[443]

On the face of it this has the look of any number of other unrealized projects and wishful job descriptions that litter Petty's archive; only shortly before, in 1685, Petty himself had turned down an offer from John Aubrey of the chance to buy land and plant in Tobago on the grounds that

> the designe is a[s] forraigne and incongruous to my circumstances as any thing can bee, for I am above 60 years old, [and] am under some extraordinary thoughts concerning our affairs in Ireland[.][444]

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[442] See *Petty Papers*, 2:96-98.

[443] *Petty Papers*, 2:121. The original is in BL MS Add. 72867, ff.82-83.

[444] Petty to Aubrey, 22 August 1685, in BL MS Egerton 2231, f.96. Aubrey's original letter to Petty, dated 17 August 1685, is in BL MS Add. 72850, ff.303-304. Aubrey appealed to Petty not only as a potential planter but also as an able advocate of plantation:

> At Christmas last the Earl of Abingdon spake to me to go to Captain Poyner to treat with him for the Island of Tobago, which his Lordship had a very great desire to purchase: as things were upon the point of concluding, his late Majestie dyed: which made his Lordship alter all his measures. ... 'Tis a most blessed Island as any is in the world, and the purchase of the whole Island (except so many thousand acres which the captain reserves for himselfe) comes but to five thousand pounds: and 2000 his Lordship would in a quarter of a year receive from persons that would give over. This was before the Western Rebellion: There are now more male-contents that would be glad to leave this Nation: and the Prisons in the West are full of Prisoners, which shortly will be tried. ... Mr W. Pen would assist my Lord in this business but if his Lordship will neglect it, 'tis pity such a criticall opportunity should be lost by others: it concernes not me: but I conceived it could doe You no hurt to acquaint you with these things: and for ought I know it may turne to advantage to you. ... There is

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Nearly a century later, however, Petty's great-great-grandson William, Lord Shelburne was able to claim over five thousand acres of countryside and three city lots in Philadelphia on the strength of Petty's presence on the original list of purchasers there.[445] Though unrealized for a long time, the Pennsylvania purchase was real.

Petty had begun thinking seriously about plantation in America even earlier, around the time of his wife's involvement with Penn's plan. In notes from c.1681 on "The charge of a share of 5000 acres in Pensilvania" Petty – evidently following conversations with Penn on the subject – attempted to estimate the cost of clearing land, transporting, housing and employing laborers, building houses and fencing an estate.[446] Papers apparently from 1685 compared the relative costs and benefits of American plantation: "Whether It bee better to transplant out of England in Ireland or America?" and "What danger it is to Let people go out of England into Ireland or

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> land enough, 'tis something bigger then the Isle of Wight. It is not unlikely that you may have such arguments as might renew my Lords desires.

In his response Petty added to the excuse of age that "nor am I willing to be a Leeder of malcontents", but it is evident that the idea had a certain appeal for him as a theorist if not as a planter:

> if there were two or three such Partners as I did like and could trust, I might (things standing well at home) venture 500 upon such a Designe; for my opinion is, upon what I have observed from the Accounts of the Peeple that not above half the Teeming Women are maryed, and that if the Government pleased there might bee such a multiplication of Mankind, as in 1500 year[s] would sufficiently plant every habitable acre in the world. (BL MS Egerton 2231, ff.96-97.)

This does suggest, in spite of his refusal to participate in the scheme, that Petty had attempted to inform himself somewhat on the condition of the island and, in particular, its population. But no other notes survive.

[445] *Petty Papers*, 2:97-98.

[446] *Petty Papers*, 2:110-111. The original is in BL MS Add. 72867, ff.64-67.

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America, and to which most?"[447] This uncertainty suggests that Petty remained in two minds about American plantation through the early 1680s, and even in 1687 he expressed concern that the "American Colonyes [be] made profitable."[448]

As with Ireland, however, he seems ultimately to have seen the American colonies as inevitable if in some sense regrettable facts, and another paper of 1685 rather cryptically mentions "American Plantations" as a "desideratum" for England.[449] And as he became more nervous about the state of Ireland, the American colonies may have come to seem like a tempting reservoir of solidly English colonists. In a set of "Conjectures" written in 1685 Petty predicted both "That the french & Irish will joyne & invade England & Scotland" and that "Many will go to America."[450] Petty wrote elsewhere the same year that

> It is probable that the French Monarch, doth not onely in generall ayme at the universall Monarchy of the West, but in particular of the Soveraignty of the Seas, so anciently claymed by England; and to bee Master of Trade, unto both which, Ireland by its Scituation since the planting of America, doth eminently conduce.[451]

Ireland, yet untransmuted, was liable to invasion; its intermediate position between Europe and America would help whoever controlled it to control trade and the seas as well.

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[447] *Petty Papers*, 2:109-110. The original is in BL MS Add. 72867, ff.68-69.

[448] In a paper entitled "For Strengthning the Empire of England", in BL MS Add. 72866, ff.104-105.

[449] BL MS Add. 72866, f.1.

[450] "Quieting Ireland" (1685), BL MS Add. 72881, f.72.

[451] BL MS Add. 72881, f.88.

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Peopling the Atlantic colonies while transmuting Ireland was one way to counter France,[452] and the obvious way to people the colonies without exporting "teeming women" from England – where they were needed both to counter England's under-population and as the engines of Ireland's transmutation – was to encourage the English to marry Native American women. The obvious problem with this, from Petty's point of view, was precisely the importance of women in the household: if English women could transmute the Irish, then surely Native American women (who existed *en masse* and not, as the transplanted Irish women in England, one to a parish) would transmute the English. After all, intermarriage between English men and Irish women, resulting from the insufficient efforts of the English state to encourage and oversee Irish plantation, had caused the degeneration of the English planters there in the first place. Petty himself had conjured the threat of estrangement between England and the Atlantic colonies with just this history in mind. His view of the

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[452] As in "Twenty Eight Remarkable points in the essay about the Analysis populi" (c.1686), BL MS Add. 72866, ff.53-54, or in "Remedies for the King" (1686), BL MS Add. 72866 ff.59-60, wherein Petty argued that England's Caribbean colonies could support twice their current population. (The same paper also proposed an increase in the number of Catholics throughout the empire; see below.) This was based on the estimate in another paper

> That the King hath Anno 1685, 100 Millions of Statute Acres of Land within the Islands of Great Brittain and Ireland, the Isle of Man, Jersey, Gernsey, Jamaca, Rode Island neer New England, Bermudus, Barbados, St Christophers, Antego, Nevis and the rest of the Caribee Islands, as also Bumbay, besides his Interest upon the Continent of America, in Hudsons Bay, Nova Scotia, New England, New Yorke, New Jersey, Pensilvania, Mary Land, Virginia and Carolina, all which makes the second best Interest in America.

and "That there are unmaried Teeming women, amongst his said subjects, enough to double the said 10 millions of People, in about 25 years" ("6 Points concerning the King's Wealth, Power and Government" (1685), BL MS Add. 72866, ff.17-20, f.18). (It seems from this that Petty did not think Rhode Island was part of the North American mainland.) In a proposal "That there be an Act for taking away all Tests, Oaths, penal Laws and Incapacitys depending upon religion" (c.1686), BL MS Add. 72888, ff.68-69, Petty also called for an Act of Parliament "For regulating ye American Colonys and Encrease of ye people."

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problem, and of the place of transmutation in both the narrative of Irish plantation and in colonial situations generally, is revealed by his attempt to get around it.

In the mid-1680s Petty developed several schemes for plantations that attempted to apply the lessons of Irish plantation to America. One such was even entitled "Irish colony" but endorsed "The description of a Colony or Towneship to bee made in Ireland or America"; it described a model colony consisting of a walled town surrounded by fields surrounded by further walls, the interlocking economic operations as well as the general maintenance of the whole coordinated and overseen by a colonel.[453] A set of "General Cautions concerning Pensylvania" included much of Petty's ordinary advice (such as to "Keep an exact accompt of the people" and to "Discourage the Learning of lattine & greek... but promote arithmetic & measuring & drawing") but also counseled the reader, perhaps Penn himself, to "Avoyd Stragling plantations", the sort of unsuccessful private enterprises that had plagued Irish colonization efforts.[454] "A Proposall concerning American Plantations" proposed a 40,000-acre riverside plantation more or less on the model of the earlier "Irish colony",[455] while a paper "Of American Planting" included a map describing the same colony, designed now to support 10,000 people at the start, "And when there bee 20,000 people To plant as much more on the other side of the River."[456] Only in this last paper did Petty suggest the demographic basis for the proposed colonial expansion, and its relationship to the Native Americans outside:

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[453] BL MS Add. 72867, ff.86-89.

[454] *Petty Papers*, 2:114-115; the original is in BL MS Add. 72867, ff.72-73.

[455] *Petty Papers*, 2:119-120; the original is in BL MS Add. 72867, ff.78-81.

[456] *Petty Papers*, 2:111-113; the original, with the map, is in BL MS Add. 72867, ff.70-71.

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> That the Indian may not live within the plantation, but that markets of furres, deere & foule, bee kept neere the Line [i.e. the border of the plantation].
>
> That the English may buy Indian girles of under 7 yeares old and use them as wives, even with polygamy regulated by authority.
>
> That no youth of between 18 & 58 yeares old, nor woman of between 16 & 41 yeares old, bee unmaryed, without manifest impediment by the magistrate.[457]

What is interesting about this from the point of view of transmutative political arithmetic is not its drastic nature; as Petty wrote this he was thinking of increasingly drastic solutions for Ireland as well. Nor is it even the idea that polygamy might be instituted as a way of encouraging demographic growth, startling as this is. Petty thought polygamy normal to at least some "Indians" and even discussed the possibility of establishing such "Californian marriages", or variations of them, in England.[458] What is interesting is that it confirms both the exclusion of non-subject

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[457] *Petty Papers*, 2:113; BL MS Add. 72867, f.71. Though the paper is not as clear as it could be, Petty's proposal does *not* seem to be that the English "use" seven-year-old-girls "as wives", but that they purchase the girls at under seven, raise them as English women, and marry them later on. As the third part of the quotation makes clear, it was procreation that was the point, and – as the same quote (and a host of other material) establishes – this was only likely between husbands of over 18 and wives of over 16 years of age.

[458] As in a paper on "Californian Marriages with the Reasons thereof", in *Petty Papers*, 2:52-54; see the other papers printed by Lansdowne in *Petty Papers*, 2:49-58, under the heading "Multiplication of Mankind." It should be noted that Petty's ideas on polygamy (and adultery) were at odds with the more traditional view that fornication hindered fertility – a view expressed, among other places, in the *Natural and Political Observations upon the Bills of Mortality* (London, 1662), which fact may strengthen Graunt's claim to authorship. A long paper on "The naturall & pecul[i]ar Interest of Ireland" (1683), BL MS Add. 72880, ff.121-151, suggested revising marriage practices and regulations in the interests of maximizing population and is worth quoting at length (ff.128-131):

> Before wee speak of the mariage & Cohabitation of all these people (which must bee ordered and established by the Soveraigne Power of the Country) wee must first consider whether the Law of God bee not so cleer and absolute for the way of Mariage now practised, That there is no room left for the Soveraigne Magistrate to alter any thing therein. To which purpose wee must first State the present way and Method of Mariage, which is that a man and a woman takeing each other before a

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people from transmutation and the role of women suggested by Petty's proposals for transmuting Ireland to a surprising level of detail. Transmutation aimed at divisions within the body politic. Ultimately, it was motivated by the horror of civil war common to nearly all Englishmen of Petty's generation and theorized most impressively by Thomas Hobbes. The Indians of Petty's papers were not part of the body politic as the Irish were because they were not subjects of the King of England as the Irish were. They might need to be fought, and they ought to be kept at a safe distance, but there was no reason to transmute them. Petty was not an imperialist in the expansive sense: transmutation was his response to the problems expansion had

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> Minister... must never afterwards Carnally know any other... altho they should find each other unfitt for Children, or disabled by loathsome uncureable diseased; or under an intollerable hatred and malice to each other without any remedy by Divorce, but upon Cawses almost impossible to bee provd; and then without the remedy of a new marriage. ...
>
> Now the question is whether the holy Scriptures bee absolute for such a kind of mariage? Or whether the greatest part thereof bee not the Law of the Land and ancient Custom thereof? And whether the Law of God and Nature, do extend any further then that man and woman shall bee joyned together in Unam Carnem, & bee obliged to make provision for their young Ones t[i]ll they can help themselves? And whether the Law of God doth not leave all other Circumstances to bee setled by the Laws of the Age and Country; for wee see that before the [floud?] and before our Saviour and in severall ages & countrys of the World, the Laws and practis of mariage are very different. Wherefore leaving this matter to Divines, and supposing that the fundamentall Law of God and Nature is, That Men and Women should bee so joyned together, as may produce most Children, and make them most usefull for the Common-Wealth, Wee humbly conceive (at least by way of supposition, and with perfect submission to the Laws of God & Man and of Church and State, That there being 460 [thousand] males of between 18 and 26 years old to 300 [thousand] ffemales of between 15 and 45 years old, that every such teeming ffemale, should allways and with all decency, bee provided of a Husband, especially since the Charge of all the Consequences of such Mariage is but one half penny per diem to the woman and one penny per diem to the man.

Petty closed his discussion of the topic abruptly, and with understatement:

> It may bee here expected, That the method of the mariage of 460 thousand males to 300 thousand Females should bee sett downe, So as the greatest propogation possible may bee effected: But because the same may appear Uncouth and Ridiculous untill Men of greatest Authority have approved of the Designe it self, Wee shall here wholy omit the Description of that Method.

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already created, not (in his hands) a method of expanding further. The Irish had to be transmuted because they were essential to the English interest but remained awkwardly separate from it. Pennsylvania's Native America neighbors, who existed in Petty's mind as a distinct and coherent nation perhaps comparable to the Irish in 1170, could not be allowed to become so essential.

As a source of women, however, the Native Americans outside the colony were potentially vital. Here was the paradox: Native American women, as women, might contribute to the English interest; as "Indian" women, they might destroy it. Petty's answer was to introduce them to English life before they were really either. The formative period of childhood extended, in Petty's and many others' opinions, to around seven years of age.[459] Seven was the age at which children began school or apprenticeships, the age at which they left their mothers, who had given them language and a sense of identity. Half the reason Petty thought English women could transmute Ireland was precisely their responsibility for children under seven (the other half was their appeal to their husbands). Here, the answer to the problems posed by setting Indian women over English children was dealt with by taking the Indian women in while they were still "girles of under 7 yeares old". Not yet fully formed by their mothers' influence, they would not exert such influence on their own children. Though born Indian, they would be raised at least partly in an English community, and might therefore function, more or less, as English wives and mothers. The

[459] As Petty put it in "The naturall & pecul[i]ar Interest of Ireland" (BL MS Add. 72880, f.127):

> [A] young Child is or need bee of no Charge after it is full 7 years old; For that any man who hath employment for it... will take such a Child Printice for 14 years; to the age of 21, and gayn sufficiently thereby, So as wee are to make provision onely for the Children of 7 years old and under.

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mechanism of transmutation would be neatly circumvented – in a way that confirms what that mechanism was.

A list of "Quaeries concerning the nature of the Natives of Pensilvania" that Petty wrote around this time (1686) throws a final light on how political anatomy and political arithmetic did and did not apply across the Atlantic. The paper opened with a string of nineteen questions about the size and shape – collectively as well as individually – of the population: its age-structure, the proportion between men and women, women's child-bearing years, the incidence of different diseases, the number of deaths each year. There followed six "Other queries concerning their policy, Language and Habitations", including

> What is the true meaning of 'King' amongst them? hath hee power over Life & Death? and over the Plantations and Goods of his subjects? ... By what Title doth hee clayme his Power[?] ... How many subjects, men, women & children, hath a King commonly there?

Fourteen questions "Of their Religion and Marriages" asked about their opinions of death and the afterlife, God and Creation, forms of worship and "the Rules of marriage", while a final sixteen "Of their Oeconomy & exercises & Learning" enquired about housing, diet, clothing, weapons, tools, measures of exchange, medicine, and their opinion of European life.[460] These were all the questions of political anatomy – of *The Political Anatomy of Ireland*, or of another set of "Questions concerning Ireland" (1686) which Petty had further endorsed as "41 Queries concerning Ireland. Ordinary & Extraordinary, generall & speciall, most of

[460] *Petty Papers*, 2:115-119. The original is in BL MS Add. 72867, ff.74-77.

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which may serve for any other state."[461] It is tempting to think that implicit in Petty's questions about the natives of Pennsylvania was the same program that his political anatomy of Ireland had led him to elaborate.

But Ireland was not Pennsylvania, and not every political anatomy implied a transmutation. Viewing Ireland as an English colony makes it very easy to see Petty's Pennsylvanian papers as a straightforward "Atlanticization" of his Irish projects, and in a certain sense they were. Clearly, though there are fewer of them, they illuminate the intellectual framework and assumptions of transmutative political arithmetic just as much as do the Irish proposals. But they do so from the opposite direction, and as important as were the similarities between Ireland and the Atlantic colonies, the differences were still more important. Ireland was a kingdom as well as a colony. The political anatomy of Ireland revealed two (or more) parts of the body politic divided against each other, and it was against this sort of internal division – the dangers of which were all too fresh in the minds of Petty's generation – that transmutative political arithmetic through transplantation and "proportionable mixture" was devised. Petty saw more than one Atlantic society, and began not one Atlantic political anatomy, but at least two: one for the English colonists, the other for their neighbors. Here was no divided body politic, only two societies in mutual tension. It is just this political anatomy of the Atlantic colonies that explains why transmutative political arithmetic remained an Irish project.

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[461] BL MS Add. 72882, ff.94-97.

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Political arithmetic and the politics of religion in the Three Kingdoms

During the early and mid-1680s Petty extended political anatomy to the American colonies in a way that clarified the natural mechanism of transmutative political arithmetic, not by applying it but by specifically precluding it in circumstances where transmutation was politically undesirable. During the reign of James II, he adjusted transmutative political arithmetic itself to the shifting politics of religion and the monarchy in the Three Kingdoms at a moment when what was politically desirable was itself changing, and in a way that illuminates his more fundamental aims and commitments. Implicit in Petty's engagement with broader concerns was a broadening of political arithmetic itself: it was no longer just the answer to Ireland's problems, but to the problems faced by James II as the Catholic king of Protestant England. As it expanded to embrace the politics of religion on both sides of the Irish Sea, political arithmetic metamorphosed from a project for transmuting the Irish to a program of demographic balances that ultimately required "the Catholication [sic] of the three kingdoms." Understanding how such a reversal could happen requires examining Petty's attitude to religion and its relationship to the body politic. Petty was not simply shifting with the political wind. Changing politics certainly provoked him, but the changes they provoked him to make made sense in terms of the political arithmetic he had already elaborated.

As he had made clear in *Political Arithmetick*, Petty favored a policy of religious toleration both out of pragmatism (on this score the role of Dutch toleration in attracting immigrants influenced a number of contemporary commentators, even

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Roger Coke) and on the principle that conscience could not be forced, that belief was not subject to will. There is little unambiguous evidence about Petty's own beliefs, and different authors have claimed him for different camps. Whatever his formal affiliation, Petty embraced a humorous, even mischievous skepticism and applied it universally. Aubrey wrote that

> He can be an excellent Droll (if he haz a mind to it) and will preach *extempore* incomparably, either the Presbyterian way, Independent, Cappuchin frier, or Jesuite.[462]

But that is by no means to say that he did not believe. Petty, for his part, maintained in his will that

> As for Religion I dye in the profession of that faith & the practice of such worship as I find established by the Law of my country not being able to believe what I please my self, nor to worship God better then by doing as I would be done unto & observing the laws of my country & expressing my love & honour to almighty God by such signes & tokens as are understood to be such by the people with whome I converse God knowing my heart even without any at all.[463]

The concrete implications of this attitude are shown in his response to his friend John Graunt's conversion to Catholicism. Along with a rapid decline in his friend's fortunes, this seemed to alienate Petty, who wrote to Graunt that "As for difference in Religion you have done amise [sic] in sundry particulars", but ended by saying "wee leave these things to God & be mindfull of what is the summe of all riligeon",[464] while writing to a mutual acquaintance of theirs that:

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[462] John Aubrey (ed. O.L. Dick), *Aubrey's Brief Lives* (Ann Arbor, 1996), 240.

[463] BL MS Sloane 2903, f.18.

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> I converce lesse then formerly with Mr. Gra[u]nt, he having declared himselfe a Papist, & of a religion which I take to be both false and inconvenient.[465]

In religion, Petty seems to have valued inward conviction, but also outward convenience, over matters of doctrinal or liturgical detail. As he wrote to Southwell,

> When any Boddy would have you to bee a Roman Catholiq, a Papist, a Protestant, a Church of England man, a Presbiterian, Annabaptist, Quaker, fanatick &c, or even Whig or Tory, Let them quit all those giberish denominations and uncertaine phrases, but make you a list of *Credenda* and *Agenda* necessary for your Eternall happinese, and give you their reasons for the same.[466]

Persecuting consciences in the name of "giberish denominations" was reprehensible, but so was risking one's own life, limb, and property for them.

It was not that Petty thought religious settlement and forms of worship irrelevant; only that, to a certain extent, it might not matter *which* church was established or what the precise forms of worship were. The social and political function of religion was vital, but was largely detachable from its content. Like many latitudinarians, Petty strove to define the essentials of religion – both for their own sake, and so that the artificial divisions caused by inessentials could be dispensed with. As religious tensions rose – from the debate over toleration or comprehension of dissent in the early 1670s, through the tumultuous years of the Popish Plot and the

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[464] Petty to Graunt, 18 January 1672/3, in BL MS Add. 72858, f.82.

[465] Petty to Mr. Holland, 23 August 1673, in BL MS Add. 72858, f.111.

[466] Petty to Southwell, 1 April 1686, in *Correspondence*, 186-187.

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ensuing crisis over the exclusion of the Duke of York, to the accession of the Duke as James II – his pursuit grew in vigor.

Many of the astonishingly numerous papers on religious topics in his archive emphasize the social and political function of both public worship and some form of private belief.[467] Religion played an essential role in building faith between rulers and ruled, ensuring public peace, and promoting obedient and faithful service:

> Man is a Religious Animall, and onely men hope that their Earthly Soveraines will deale very justly, when such soveraines believe there is a most Just God above them. ... Men, either for the Love of God or the feare of Hell, will forbeare doing such mischief to their Neighbour as the Law canot reach. ... Men beare paines & wrongs more patiently, when they hope that God will balance all in the next life. ... Soldiers will be most valiant & faithfull when They believe Death to bee the doore of happines.[468]

Nor did Petty's appreciation of the social utility of religion necessarily preclude genuine belief. Petty denigrated "What is vulgarly meant by Worshipping, honoring, & glorifying God" – that is, "Enriching, obeying, & fighting for those who pretend to be his priests", "Praying... for such benefits as Man canot give us", and (a simultaneously linguistic and moralistic critique)

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[467] That is, astonishing for anyone reliant on the printed selections. Three whole boxes of Petty's manuscripts, amounting to several hundred folios, are described in the catalogue as dealing mainly with "religious" topics. Besides these, dozens of papers in other boxes (especially those catalogued as dealing with "Ireland") might just as easily be so described. Yet the fifteen papers on "religion" included in the two printed volumes of *Petty Papers* amount to thirty pages of text (1:113-145) and all come from the same box (BL MS Add. 72887). By comparison, nearly every extant paper relating to the American plantations is reprinted in the *Petty Papers* (2:93-121), taking up roughly the same amount of space. The resulting impression – that Petty wrote about as much on one as one the other – is profoundly misleading. A fuller treatment of Petty would have to devote a great deal of attention to his work on religion; in the present study I limit my focus to those aspects of greatest relevance to political arithmetic.

[468] "Religion" (c.1680s), in *Petty Papers*, 1:116-117; the original is in BL MS Add. 72887, ff.26-27.

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> By patheticall Metaphoricall expressions & allusions to set forth in a general way his power, wisedom, mercy &c, when wee either deny or ignore them in particulars.

And he listed further "Disadvantages to the world by the same", including "The vast expence of sacrifices & preists", "The great bloodsheds by wars", and various "Miscariages by superstitions" – among them the characteristically Pettian bugbear of "needlesse restraints put upon [matrimonial] conjugations", which hindered the multiplication of mankind.

These were the effects not of religion *per se*, however, but of *vulgar* religion, and when Petty closed the paper with a list of questions about nature, by the elucidation of which "God would be much honored", there is no hint of sarcasm.[469] It seems that he thought of his own contributions to knowledge in just this light: he began a slew of works on "the multiplication of mankind" by helping "a good Man... Writing against Atheism... answering Cavills against the Resurrection", and considered his estimates of the size and rate of growth of human population "a brave argument against Scripture Scoffers and Prae-Adamites."[470] Such men were every bit as harmful as the peddlers of superstition. Petty's clearest arguments for toleration are often also his strongest affirmations of religion, and of its role as a supplement to the law and, like the law, a pillar of the state. "The Effects of a Good Religion" (c.1685) sums it up:

> No man ought to disturb another in that Religion
> 1. Which makes & keepes him good morally.

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[469] *Petty Papers*, 1:117-118; BL MS Add, 72887, ff.26-27.

[470] Petty to Southwell, 20 August 1681, in *Correspondence*, 92.

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> 2. Which keepes him from secret sins not cognizable by the Magistrate & contrivances of the same.
> 3. Which gives him courage in adversity.
> 4. Which keepes him from dreading death & the infirmities & paines of Old age.
> 5. Which makes him conformable to the Lawes of the Land & Customes of the Country.
> 6. Which breakes violent passions & appetites.[471]

For Petty, the Church was the Nation at prayer, a vital aspect of the body politic and, like its other aspects, subject to unfortunate but rectifiable divisions. Alongside transmutative political arithmetic, and often at least implicitly bound up with it, were schemes for institutional reform (it is tempting to say rationalization), and among these were projects for the reform of the church. An untitled paper, written sometime in the 1670s or 1680s and thus almost certainly during the period of political arithmetic, describes some of Petty's ideas about the form this might take:

> The Church is the People congregated & Incorporated upon the accompt of seeking eternall happines after Naturall death & extraordinary advantages before. The Guides of ye People on the way to these ends are called Ministers, Priests or Divines. The Places of their flocks dwelling are called Parishes, which are to consist of as many familys or people as One Priest can officiate for, that is of so many adult persons as can hear him preach.[472]

Petty gave thought not only to how the ministers would be heard, but to what they would say. Arguing here that knowledge of God came not only from scripture but nature, he recommended that ministers engage in a broad range of studies: mathematics, natural philosophy, natural history, antiquities, languages, and the skills

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[471] *Petty Papers*, 1:118; BL MS Add. 72887, f.25.

[472] BL MS Add. 72887, f.28.

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of textual criticism. All this was necessary simply in order to discern God's true will from false prophecy, however, and

> the Work of divines is not to distr[ac]t their fl[o]ck wth their owne Philosophicall opinions & conceits, but to teach them thoroughly ye establishd lawes & customs of Religion, and to show them how God doth punish & reward ye observence & breaches of them, and to... punish their [Motions?] & temptations to Sin & to apply generall & particular Rem[e]dyes unto Each of them.[473]

The focus here was clearly not on the pursuit of natural knowledge for its own sake (which fell to others) but instead on its application to the religious and moral instruction of the multitude – to its social function. Petty elaborated on the minister's duty to know his flock and its fortunes, and to draw conclusions accordingly for their benefit:

> [T]he Priest ought not onely to know in generall ye Number & Names of every Soule under his care but also their ages, sex, condicon, Trade, sect [and?] <pr[iva?]te> opinion, their art[,] their births, sicknesses, marr[ia]ges, deaths, their Estates, their thriving & decaying... their dealings & bargain[in]gs, the differenc[e] between Seesonable & unseesonable Weather, fru[i]tfull & barren lands, yeares of plenty & dearth, hea[l]th & Mortality, barranesse & fecundity, War & peace, ye Settlement & [Commotion?] of Mens Mind, Obedience & Sedition &c. To ye end, That when Sin abounds hee may bee really able to tell the people how why & wherein ye Same is, Who ye Judgment & anger of god hath been shewne, [in the?] Number of those who dyed in the yeares of Sin more then in yeares of godlines lesse number borne, more have been sick, corne & fruite more scarse, Mor[e] tempestuous weather, more Murrayne among ye Cattle, how & what Spe[cie?]s of grayne & fruite has fayld, And not talk at Random when hee himselfe is angry wth his parishi[o]ners.[474]

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[473] The paper is in BL MS Add. 72887, ff.28-31. The quotation is from f.29.

[474] BL MS Add. 72887, f.30.

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Petty's proposals for church reorganization centered on the more effective exploitation of the institution's social role, in part through a rationalization of its relationship to God.

This role, for good or ill, was not in principle limited to what Petty precociously called "the Anglicane Church".[475] It characterized any church worthy of the name, even, perhaps, the Church of Rome. In *The Political Anatomy of Ireland* Petty had suggested replacing Irish Catholic priests with (fewer) English Catholic ones, as part of his project of reconciling English and Irish interests. He did in 1675 propose that the Church of Ireland pay for translating the Bible into the Irish language and "character" and "salariate fitt persons to preach & catechise Weekely in all parts, Or to all people in Ireland, in an intelligible language", but this may have been less about converting Catholics than instilling some sort of religion in those who lacked any (Petty described the current situation as a "Scandall of Religion & Civility").[476] In his "Proposals about the Revenue, Expence, future Estate of Ireland", Petty suggested

> That the Number of [Catholic] Priests conived at, bee no more than are necessary, & that such priests do procure the abroga[tion] of 12 holly dayes in the year, Unnecessary Churchmen, & hollydayes, being a great damage to an underpeopl[e]d country.[477]

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[475] In "A Dutifull and moderate answer, to the Papers concerning Religion, the Catholiq Church, the Churches of Rome & England &c, left by the late King Charles the 2d" (1686), BL MS Add. 72887, ff.78-91, f.88.

[476] In "A Proposal for Ireland" (1675), BL MS Add. 72879, ff.98-103, ff.99-100.

[477] BL MS Add. 72879, f.90.

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But he did not propose getting rid of the priests altogether, and it seems to have been the deleterious economic effects of large numbers of holy days that most offended him. In "An Appendix concerning Papists & Protestants" (c.1685), Petty suggested that papal authority was a threat not only to English authority but, more immediately, to health and property.[478] He put the same points clearly in one of the longest of the unpublished documents in the Petty archive, a manuscript of thirty folios entitled "The naturall & pecul[i]ar & present Interest of Ireland",[479] dated 1683:

> [T]o allow the Pope a Power of forbiding of meats, is to give him power over the Lives and Healths of all the People; and to allow him to forbid Labour as many dayes as hee pleases, is to impower him to empoverish the People to what Degree hee pleases; and to allow him the Supreame Power in Matrimoniall Cawses, is to enable him to dispose of the Inheritance of Lands, and the Succession to Kingdomes.[480]

The question was primarily one of social utility and, to a lesser extent, political authority, not belief – as Petty's views on marriage, already briefly alluded to in the first part of this chapter, demonstrate. It reflects Petty's judgment of Graunt's Catholicism: false, but also, and perhaps more importantly, inconvenient.

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[478] BL MS Add, 72888 ff.18-20, f.20.

[479] BL MS Add, 72880, ff.121-151.

[480] BL MS Add. 72880, f.147. Petty evidently thought the threat was more than hypothetical (f.135):

> The poor Familys of Ireland, having 300 days in the yeare to work in (excluding out of 365, 52 Sundays, and 13 hollidayes) they are observd not to labour effectually above 2/3ds of the said 300 dayes; partly for want of work, partly by reason of their overplus hollidays, and partly for want of Strength and Skill, their food being very insufficient for much labour, so as in two thirds of the said 220 thousand Familys (being 147) labouring stoutly and dexterously their 300 dayes per annum, are equivalent to the whole number working as now they doe.

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There were, of course, significant doctrinal differences between the English and the Roman Churches, and the political importance of these went beyond the length of the working year. The fundamental political problem posed by Catholicism was its division of spiritual and temporal power, its definition of the former, and the authority over both that it gave to the Bishop of Rome. Another major problem with Catholicism was immediately epistemological, but implicitly – given Petty's Hobbesian assumptions – political as well. Petty discussed both in the third "chapter" of "The naturall & pecul[i]ar & present Interest of Ireland" mentioned above. "Papists," he wrote, "differ from other Religionarys in two principall Points, which... affect their Temporall Interest, That is to say in the Popes supremacy, and Transubstantiation." Papal supremacy caused obvious problems for Catholics both as potential office-holders and simply as subjects:

> [F]or with what reason can men bee admitted to Elect or bee elected to the Legislative Power, who profess that the Supreme or Legislative Power in Ireland, (as to matters of Chief concernment) is in the Pope, a forraigne Prince? Or why should the Subjects of the Pope, bee allowed any Jurisdiction over the King of Irelands Subjects? And may not great severitys bee used to hold the hands of the Papists of Ireland, when It is but suspected they will lett in and assist Papists from abroad to prejudice their own Country?[481]

This observation was nothing new, though for Petty it remained less important than for many others, since he stoutly maintained that the 1641 rebellion – the premiere example of Papist perfidy in the King of England's dominions during the seventeenth

[481] BL MS Add. 72880, f.146.

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century – had been, like its punishment, a political not a religious act.[482] "As for Transubstantiation," Petty went on,

> It makes men become as Senslesse; brings them to deny the Judgement of their Senses, to admit of impossibilitys and contradictions, as that a Priest cannot onely change Bread into Flesh, but Bread (which is a Body) into the Incorporiall Substance of a Mans Soule, and into the transcendentall Substance of God himself[.][483]

This was not only philosophically offensive, but also socially inconvenient: "I say it is unsafe to deal or converse with such men, who cannot trust their owne senses."[484] Men who could "admit of impossibilities and contradictions" could hardly be relied upon, for example, as witnesses or jurors, much less as judges.[485] Catholic doctrine was politically problematic.

Nevertheless, Petty consistently sought ways to circumvent the difficulties of doctrine to pave the way for toleration. "It is the Interest of Peacable Papists to quit this Supremacy and Transubstantiation", he acknowledged. "But perhaps it is the Interest of governing Protestants, to lett them continue in the same," if only "That they may never want a fair pretence to punish and empoverish them."[486] In any event Catholics were no worse than "those who are called Fanaticks... who are governed by

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[482] See, e.g., BL MS Add. 72880, f.149.

[483] BL MS Add. 72880, f.146.

[484] BL MS Add. 72880, f.147.

[485] This is an interesting philosophical variation of the standard English claim that Catholics were dispensed by the Pope from keeping faith with Protestants (since the latter were, from the Roman point of view, heretics), and that the Irish could therefore never be trusted.

[486] BL MS Add. 72880, f.147.

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their owne private Spirit" and "Who dislike Episcopall Government".[487] At the end of the foregoing discussion, he pronounced himself

> inclind to believe that If the said Popish and Fanatick Dissenters would give security not to disturb the Publiq Peace; Nor actively violate the Lawes of the Land, That a convenient Liberty might bee allowed to both the said Dissenters, excepting the said two grand Points [of supremacy and transubstantiation].[488]

This might seem to mean little, given the size of these "grand points." But Petty's various proposals for loyalty oaths, church comprehension, and toleration of Catholics as well as Dissenters suggest that they did not seem insurmountable to him. In one of many examples, "An Essay concerning the Tolleration of heterodox p[er]sons, Liberty of Conscience &c & how to bee allowd" (1685), Petty asked, provocatively,

> Whether The Soveraigne of a Country may or ought to give License to all or any of his Subjects to speake professe & practise What they please (differing from ye Lawes) about the Worship of God & beliefe in Divine matters[?]

His answer was "No." But he then asked "what else may be done herein", and answered that the articles of every faith should be codified in law. Dissenters might then take oaths affirming their belief in a given set of articles, and affirm at the same time their allegiance to the laws and the government against all threats. Once

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[487] BL MS Add. 72880, f.148.

[488] BL MS Add. 72880, f.148.

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registered they could pay a tax and be tolerated, though subjected to a weekly "State sermon."[489]

> As for Sceptisismes concerning the Person and Family of the King, and Forme of Government, I take them to bee not Matters of Religion, but such as must bee regulated by the Laws of the Land.[490]

Conceptually distinct as these things may have been in Petty's mind, they were practically inseparable in the politics of the three Stuart kingdoms throughout the period of his political arithmetic. The disintegration of the Cabal ministry that was taking place as Petty completed *Political Arithmetick* and *The Political Anatomy of Ireland* was bound up with the failure of Charles II's strategy of pursuing a French alliance (enshrined in the Treaty of Dover, one of whose secret articles stipulated that Charles would declare himself a Catholic at the earliest convenience), which had implicated the King in an unsuccessful and unpopular war with the Dutch as well as an unsuccessful and unpopular Declaration of Indulgence. As Petty's two large manuscripts were circulating in London and Dublin through early and mid-1673, the Test Act was purging the English administration of its Dissenters (including Petty's old rival, Benjamin Worsley, who left his position on the Council for Trade and Plantations)[491] and its Catholics – the Duke of York, the future James II, among them. But the defining event of Charles II's reign, from the point of view of the politics of religion, came in 1678 with the revelation of the Popish Plot, and with the crisis over the question of the succession that ensued over the following three years.

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[489] BL MS Add. 72889, ff.7-8.

[490] BL MS Add. 72880, f.148.

[491] John Locke replaced him.

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Petty's opinion of the Plot and of the anti-Catholic hysteria that surrounded it is hard to trace in the sources but easier to predict given his stated opinions on religion, his Hobbesian understanding of politics, and his personal associations. In a letter to Southwell written in February of 1679 from Dublin, Petty glibly reported "Here is some news – not so much of Plotts as of Counter-plotts, and of papists prodding protestants into Plotts", which may perhaps signify a general skepticism.[492] Over a month later Petty alluded to some trouble the plot had apparently caused Southwell (who was a protégé of the then-Lord Lieutenant of Ireland, the Duke of Ormond, whose relatively moderate handling of the plot in Ireland had drawn sharp criticism from English Whigs and some Irish Protestant hard-liners).[493] He noted that "the parliaments zeale to defend Ireland against the Pope and King of France is very gratefull to many" and had stimulated proposals to that end.[494] His own contribution came in the form of a few papers, including many of his usual ideas about data gathering but now emphasizing the military significance of the demographic, economic, and geographical data gathered.[495] His reaction to the Plot itself was hardly overheated.[496]

His reaction to Whig calls for excluding James, as a Catholic, from the line of succession, seems likewise to have been cold if not outright defensive, though again

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[492] Petty to Southwell, [February, 1679], in *Correspondence*, 67.

[493] Several letters from Ormond to Southwell allude to this: see, e.g., Ormond to Southwell, 1 March 1678/9, BL MS Add. 21484, ff. 44-45.

[494] Petty to Southwell, 8 April 1679, in *Correspondence*, 73.

[495] See "The Uses of the Booke mention'd by W.P." (1679), in *Petty Papers*, 1:172-175.

[496] Historians tend to agree that the pitch of anti-Catholic fervor was higher in England than in Ireland at this time, and certainly England saw the most violent persecution.

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direct evidence either way on so sensitive a subject is rare. A 1682 manuscript touting his "New Instrument of Government"[497] included the following dialogue between a skeptical "A" and an enthusiastic "B":

> A. I believe 'tis some Whig that made it.
> B. I believe not, for if a Whig bee one who hates the King's person and family and the forme of monarchicall Government and even the present established Government, I don't remember anything that shews the Author [i.e. Petty] to bee of that faction, nor indeed of any faction att all; but rather some well meaning man, that studys the peace and wellfare of his Country in all formes.[498]

As a protestation of impartiality this is commonplace, but it does suggest that the word "Whig" had a specific and unfavorable definition for Petty, at least by 1682. Petty's correspondence with Robert Wood provides more timely evidence. Wood wrote in March 1681 – a pivotal moment, just before the Oxford parliament whose prorogation marked the end of the exclusionist cause and the beginning of the Tory reaction:

> The Court should go towards Windsor in the way to Oxford the 10th instant... but there is some whisper of a Prorogation, Elections running mostly in the old Channels [i.e. in favor of the Whigs]. There is an 8° [i.e. octavo] lately come forth calld Plato redivivus writ dialogue wise, as tis said by H. Nevill, upon the Oceana Principle of Dominion founded on Property, much read by the discontented Partie. He concludes not for a Democracie (I suppose because he thinks the matter not (yet) capable of such a Forme) But that a Parl[iament] be chosen annually.... That Elections be regulated. That the Parl[iament] choose 4 Committees to manage and governe these 4 things viz 1st

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[497] The "Colloqui between A: B: C: concerning a New Instrument of Government" (1682) is printed in *Petty Papers*, I:103-111; the original is in BL MS Add. 72880, ff.72-80. "The New Instrument of Government" itself is, like the earlier "Treatise of Navall Philosophy", more a plan than a reality (though the "New Instrument" is a more substantive plan, at least, than the "Treatise"); it is in BL MS Add. 72880, ff.60-71.

[498] *Petty Papers*, 1:103; BL MS Add. 72880, f.72.

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> Forreign Alliances, Peace & warr. 2. The Militia at Home. 3. The Tresury & Revenue. 4. The Principall Officers of State as Judges &c. ... That this is the only way to preserve the Monarchy & King: I much doubt his Majestie will not be of that opinion.[499]

In September of the same year, Wood recommended that Petty read a more enduringly familiar piece of literature: "Here is a marvelous smooth Poem called Absalom & Achitophell lately come out, I suppose you may get it, tis exceeding ingenious, & thought to be Drydens." He even included a "Key" to the allegorical personae in the poem: "Abs[alom] Munmouth", "Achit[ophel] Shaftsb[ury]", and so on.[500] Petty's stance on toleration put him at odds with "High Church" Tories (though with Whig critics of "Popery and arbitrary government" no less); but his politics were staunchly monarchist and, therefore, anti-Whig. In fact, they were potentially very like the politics of James II.

James II's reign saw Petty produce more papers than ever before; even allowing for the possibility that a greater proportion of them survive, the contrast even with the last years of Charles II's reign is striking. Petty had had some contact with the James when the latter was the Duke of York, and like Pepys he probably found the new King's serious interest in naval matters a refreshing change from Charles II's more humorous take on projects such as Petty's "double-hulled ship". The papers that concern us here, however, converge along two lines that themselves diverged over the course of the reign: the defense of the monarchy (largely through

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[499] Wood to Petty, 1 March 1680/1, in BL MS Add. 72850, f.271-272. Wood refers to Henry Neville, *Plato redivivus, or, A dialogue concerning government* (London, 1681).

[500] Wood to Petty, 22 September 1681, in BL MS Add. 72850, 292-293. See [John Dryden], *Absalom and Achitophel. A Poem* (London, 1681).

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the pursuit of toleration), and the defense of the Irish settlement. The former was a natural direction to take because it reflected Petty's evident interest in toleration while reflecting James II's policy interests. The latter was, similarly, an old theme: *The Political Anatomy of Ireland* had suggested transmutation as a way of completing the process for which the Acts of Settlement had laid the groundwork. But it grew more urgent as James's pursuit of toleration for English Catholics led him more and more to indulge the hopes of Irish Catholic critics of the Restoration land settlement. As in the past, Richard Talbot, soon Earl of Tyrconnell, led the way. As Tyrconnell rose, Petty found his loyalties divided. His resolution of this division was a final twist in transmutative political arithmetic made to save a failing monarchy and based on a view of the body politic that foreign invasion and internal war would soon make impossible.

Petty's first concern when James came to the throne – other than the renewed possibility of his own advancement – seeems to have been stability. In a paper probably written late in 1685 and suggestively entitled "The Dangers & Evills of disloyalty demonstrated", Petty listed some of the achievements of and possible projects for the new reign, including "1. His birth right. 2. his Open Coronation. 3. The obedience of 2 houses of p[arliamen]t" and extending, rather glibly, to "8. Scotland Mild towards popery & Ireland more able for it." But the document ended with a string of questions that hinted at some of the dangers the new situation posed, to King and subjects alike:

> There have been 15 formes of government (all Vanished) between 1 Novemb. 1640 & the same day 1685. Q. What a Man worth 10,000£ would give, to have the present government demolishd, & One of the

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> other 14 set up in its Roome? ... The King hath 10 Non-papist subjects for One papist. Q. what is the hazard of setting up popery, without liberty to others, or taking away Abby Lands &c? ... Since Conscience cannot bee forced, what is the danger of [?] worshipping of God, in a way set up by the Law of the Land or Vox populi & like what has been practisd over all Europe for about 1300 yeares. Rather then following every Man his owne Judgement upon the Sence of the Scriptures? ... What is the difference between the Subjects Lutherans of the K of denmark & papists of france, both being absolute Monarchys? ... How is popery inconsistent with the formes of Government in Venice Genoa & Switzerland... How have the people fared, where the Soveraigne hath been of One Religion & the bulk of the people of another or of many others. As in India Turkey Holland Brandenburg, Hanover.[501]

The forms of government alluded to in the above were the subject of another paper, "15 formes of government between 1 November 1640 & the same day 1685", wherein the first was the government of Charles I, the fourteenth was the recent "Attempt to make Monmouth Monark" in James's place, and the last, or fifteenth form, was described with palpable relief as

> King James the 2 Crowned, with 2 houses of parliament Very conformable, an additionall Revenue, London quelled[,] an army of 18000 Men, a great Navy, Argile & Monmouth vanquished the 3 last mentioned projects Nulled & punished and the way of the 11th forme [that is, government according to the Test Act of 1673] Established.[502]

There seemed to be hope for stability, in spite of recent experience.

As for Ireland, Petty had his hands full responding to fresh attacks on the settlement. One of his papers on the subject is a direct response to a pseudonymous anti-settlement pamphlet that appeared in 1685, entitled *Twelve Quaeries relating to*

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[501] BL MS Add. 72881, f.77.

[502] BL MS Add. 72866, ff.3-4, f.3.

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the Interest of Ireland.[503] Together with an earlier and better-known critique of the settlement, Nicholas French, titular Bishop of Ferns's *A Narrative of the Earl of Clarendon's Settlement and Sale of Ireland* (printed in Louvain in 1668, but apparently now reprinted),[504] the *Quaeries* argued that the Irish had been driven to rebellion by religious persecution, and had remained consistently loyal to the King against Parliament, and therefore that the Cromwellian settlement and the Restoration ratification of its essentials victimized loyal Catholics and rewarded rebellious Protestants. Petty's own "Answer to certain Queries made by the Irish about July 1685 signed G.F.D." flatly rejected the insinuation "that the Plantiffs [against the settlement] are Cavaliers, vizt such as fought in Ireland for the King upon the same questions and Quarrell as the Cavaliers did in England", and the corrolary imputation "that the Defendents are the Creatures of Oliver Cromwell and murderers of K. Charles the first, who fought in Ireland, onely to make Cromwell chiefe in both Kingdomes."[505] On the contrary, Petty argued,

> the Suite is between the Persons who suffered in the Irish Insurrection, with their kindred, friends & Neighbors... and those who begun the Murders, Massacres, robbing, plundering and exiling the aforementioned sufferers[,] who changed the Government from Monarchy into a Supreme Councill and generall assembly, who endeavoured to alienate the Empire of Ireland from the Crowne of England, to severall forraine Potentates, Or to the Romish Clergy on the other part. Which latter sort may bee Stiled Oneilians, Renucinians, & Clerocratians, not Cavaliers and Innocents; Whereas the former party are to bee stiled English Patriots, who endeavoured to

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[503] G.F.D., *Twelve Quaeries relating to the Interest of Ireland* (n.p., 1685).

[504] [Nicholas French, Bishop of Ferns], *A Narrative of the Earl of Clarendon's Settlement and Sale of Ireland* (Louvain, 1668; rpr. In S.H.B.[?] (ed.), *The Historical Works of the Right Rev. Nicholas French, D.D., Bishop of Ferns, &c. &c.* (London, 1846), 71-126).

[505] BL MS Add. 72883, ff.51-60, f.52.

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> avenge the murders and desolations abovementioned, to preserve the Government and Religion established, and did by the best ways they could... deliver all up to the King (as they really did) and takeing what hee should please to allow them for their Service and Sufferings in the premisses. So as wee humbly affirme the War generally speaking to have been between Irish Rebells & English Patriots.[506]

In Petty's history of the 1640s, the questions at issue in England and Ireland had been essentially different, though some of the protagonists had been the same, or affiliated.[507] Further, the former had been political, not religious. However Irish

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[506] BL MS Add. 72883, ff.52-53.

[507] Petty *seems* to have kept out of the public rehashing of the 1640s in the so-called "Anglesey-Ormond-Castlehaven" debate of 1681-2. This began with the (Old English Catholic) Earl of Castlehaven's publication of *The Memoir's* [sic], *of James Lord Audley, Earl of Castlehaven, His Engagement and Carriage in The Wars of Ireland, from the Year 1642 to the Year 1651* (London, 1680), arguing that the 1641 rebellion had been partly provoked, that the Old English Catholics had joined the Catholic Confederacy in 1642 in response to indiscriminate and brutal Protestant reprisals, and that they had remained loyal to the King until divided among themselves by the papal nuncio, Rinuccini. (Castlehaven may have been motivated by the publication of Edmund Borlase's *The History of the Irish Rebellion, Traced from many Preceding Acts, to the Grand Eruption The 23d of October, 1641; And thence pursued to the Act of Settlement, MDCLXII* (London, 1680); a revised and expanded edition of Castlehaven's book appeared as *The Earl of Castlehaven's Review: Or his Memoirs of his Engagement and Carriage in the Irish Wars. Enlarged and Corrected. With an Appendix and Postscript* (London, 1684).) The Earl of Anglesey, a Presbyterian and now Lord Privy Seal, was working on a history of Ireland at the time (using documents supplied by the Duke of Ormond; Bodl. MS Carte 67, f.3, contains material "Out of a paper sent to Arthur first Earl of Anglesea when he was writeing an History of Ireland"; transcriptions of Irish material made for Anglesey and annotated by him are in BL MS Add. 4763; BL MS Add. 4816 contains "Heads, & Memorandum's for an intended General History of Ireland, By Arthur, Earl of Anglesea: All written with his own Hand"). He responded to Castlehaven in *A Letter from a Person of Honour in the Countrey Written to the Earl of Castlehaven, Being Observations and Reflections upon His Lordships Memoires Concerning the Wars of Ireland* (London, 1681), which restated the Protestant view of the rebellion – as a political act motivated by pure barbarism – and criticized the Articles of Peace negotiated in 1648/9 between the Confederacy and the Crown, then represented by Ormond. Ormond, offended, responded to Anglesey in *A Letter from His Grace James Duke of Ormond, Lord Lieutenant of Ireland, in Answer to the Right Honourable Arthur, Earl of Anglesey, Lord Privy Seal, His Observations and Reflections upon the Earl of Castlehaven's Memoires concerning the Rebellion of Ireland* (London, 1682) (see Bodl. MS Carte 50, f.258.), and commissioned Southwell to compile an alternative history of the events in question (see BL MS Stowe 83, ff.4-113; Bodl. MS Carte 98). In the end, Anglesey lost his post as Lord Privy Seal; see *A True Account of the Whole Proceedings Betwixt His Grace James Duke of Ormond, and the Right Honor. Arthur Earl of Anglesey, Late Lord Privy Seal* (London, 1682).

Petty agreed with Anglesey's strictly *political* reading of the rebellion, and in "The Progresse of Popery in England & Ireland" (1686), he blamed the 1649 peace on the Queen Mother; BL MS Add. 72888, ff.50-51. In "Observations upon the Articles of Peace made with the Irish 17 January 1648/9" (BL MS Add. 72884, ff.86-95) he concluded (f.94):

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Protestants' behaviour might have looked from Charles's scaffold, their interest was the foundation of English authority in Ireland and the settlement (the foundation for which was established as early as 1642) was the foundation of their interest. A longer and more detailed "Answer of the substance of a Treatis Intituled The Sale & Settlement of Ireland", which Petty seems to have written at around the same time, makes the same basic case.[508] The settlement had to be seen to be essential to English rule in Ireland, and to punish a national political rebellion, not religious difference. If Ireland and England, religion and politics, could be held apart this way, neither Petty's nor anyone else's royalist or tolerationist sentiment need call the settlement into question.

But however true this was in principle, in practice political alignments tended to collapse issues of religion and politics together. Through 1685 and into 1686 Petty could and did come up with any number of papers explaining the rationale for toleration to Dissenters and mainstream Protestants; it was not a rationale they bought into. As James's program became clearer and firmer, his allies among moderate

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> That the King by these Articles, either gave away his Kingdome of Ireland to the Catholiques, or else they extorted it from him, and did alienate it from England, whereupon the English Anno 1649 endeavoured to recover the same.... And Anno 1660, when they had armes in their hands, yeilded up all their said Conquests, acquisitions and themselves, to the absolute dispose of their King.

"The Survey of Lower & Upper Ormond or of the Lord of Ormond as hee was Anno 1641 & before as also in the yeare 1661 & since" (BL MS Add. 72884, ff.104-105) followed up insinuations against Ormond by looking at his personal estate. But Petty was more moderate than Anglesey in his views of Irish nature. He was connected to Ormond both through Southwell and through hopes of influence, and to Anglesey through Sir Peter Pett and, perhaps, equal and opposite hopes. After Anglesey's death, Petty wrote to Southwell (5 March 1686/7, in *Correspondence*, 258) that "his Lordship desired I should perfect his History of Ireland if he were snacht away. I have perused his papers, but cannot put new wine into old Bottles. ... In so much as I say 'Let the Dead bury the Dead'."

[508] See BL MS Add. 72883, ff.75-94. Petty also wrote a shorter "Another more true and calm Narrative of the Settlement & Sale of Ireland", BL MS Add. 72883, ff.95-104, which is printed in *Petty papers*, 1:49-55; compare similar comments in "Some Articles (not of faith) but of Sense, concerning the Rebellion in Ireland" (c.1685-1686), BL MS Add. 72884, ff.71-74.

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Protestants and Dissenters alike fell away, and he fell back on a smaller and smaller coterie of Catholic advisors, the Earl of Tyrconnell foremost among them. Petty's anxieties about Tyrconnell naturally centered on the fate of the settlement; but while Petty defended the settlement against Nicholas French and the author of the *Quaeries* by recourse to history, his critique of what he took to be Tyrconnell's plans followed the logic of transmutative political arithmetic in a new way. Rather than arguing against Tyrconnell (and, insofar as he stood behind his lieutenant, against James II), Petty tried to present a proposal that served their interests without, as Petty saw it, sacrificing all hope of union between Britain and Ireland. This change in political arithmetic was an implicit recognition that the settlement might not be salvageable in its current form, and an attempt to save the grander settlement of English power in Ireland and Stuart authority throughout three contentious kingdoms.

Several papers from 1686 suggest Petty's awareness of the changing situation and the role he might play in it. Notes dated 19 July 1686 and entitled "Catholiq News" mention the presence of hundreds of Jesuits in England and Ireland, and perhaps more importantly the issue of 160 commissions for Catholic officers in the Irish Army, which Tyrconnell was purging of its Protestants.[509] A paper dated three days earlier had stressed that the arming of Catholics was worrying Protestants; Petty proposed sending the Irish Catholic troops to England in exchange for English troops.[510] Petty followed developments closely, and worried about their

[509] BL MS Add. 72888, f.64.

[510] "Some materiall Points in the State of Ireland the 16th July 1686" (1686), BL MS Add. 72882, ff.43-46.

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consequences. But he also recognized that the King and his Irish minister were set on a policy of opening offices to Catholics.

New papers dealt with Catholicism in a new light: as something not only inevitable but, perhaps, as something to be encouraged. Petty began to distinguish between more and less desirable brands of Catholicism, writing in one paper "That the Jesuites are but as Mountebanks in ye Catholiq Religion."[511] Many more papers emphasized the common basic tenets of Christian religion, reducing the differences between Protestantism and Catholicism – setting the sovereign above both in civil matters at least – to inessentials. Petty was even willing to consider the political advantages "of a Living infallible Judge in Spirituall matters",[512] something he managed to connect to his own thinking on the inaccessibility of such matters to reason. A paper entitled "Moderate Thoughts concerning Popery" noted that the idea "That temporall paines are due for sin, Which are satisfied by Indulgence, penance or purgatory is a better doctrine to keep men from Sin, than that Christ takes all away without any paines."[513] However, revised views of Catholicism would not be enough for Tyrconnell, whose influence with James seemed to grow daily. Faced with a government bent on a new policy and faced with new problems, Petty began to reassess his views on the Irish settlement.

In fact, Petty (whose status as an expert on matters Irish remained high, boosted perhaps by the publication in 1685 of *A Geographicall Description of the*

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[511] BL MS Add. 72888, ff.48-49.

[512] BL MS Add. 72888 ff.54-63.

[513] BL MS Add. 72888, ff.46-47.

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Kingdom of Ireland, using maps based on the Down Survey)[514] seems to have met with Tyrconnell himself in May 1686 to discuss this. "The Scope & Designe of the Papers delivered to the Earle of Tirconnell the 12th May 1686 in order to an accomodation", listed eight papers whose contents reveal the nature of the "accommodation" with Tyrconell that Petty now had in mind.[515] The first was a brief historical sketch of English involvement in Ireland entitled "The State of Ireland for 500 Yeares"[516], stressing like Petty's earlier proposals the contingency of the divisions between different groups and promising that a solution acceptable to all could be found. The second was a more focused description of profitable land in Ireland, and the "Partys & Classis" that owned it in 1641 and now in 1686.[517] The third actually comprised two papers, the first of which seems to be missing; the second, however, marked an interesting departure: it proposed raising £300,000 pounds for the relief of ditressed Irish Catholics – victims, one would think, of the settlement Petty had hitherto defended.[518] Petty described the fourth, hard to identify in the current archive, as "Severall Lists of Nocents... Nominees & others who may bee thought fitt to have a share in the said Grand Summe according to different Quotas."[519] The fifth was "A List of Matters to be Prepared" – classifying different

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[514] Petty, *A Geographicall Description of the Kingdom of Ireland. Collected from the Actual Survey made by Sir William Petty* (London, 1685). A more detailed set of maps was also published that year as *Hiberniae delineatio*.

[515] BL MS Add. 72885, ff.3-6.

[516] BL MS Add. 72885, ff.7-8.

[517] This seems to be BL MS Add. 72885, ff.9-11, and perhaps f.12 as well.

[518] BL MS Add. 72885, ff.13-14.

[519] BL MS. Add. 72885, ff.3-4.

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kinds of landowners – and the last papers, though not identifiable in the present archive, apparently contained further details of what now looked decidedly like a revision of the settlement.[520] The shape of the plan, essentially an extension of the attempt at retrenchment made in the early 1660s, can be pieced together from these and other papers. New taxes would supply a fund of money which could then be used either to pay off dispossessed Catholics or to buy out a third of the Protestant landed interest on their behalf.[521]

Why conciliate Tyrconnell? Up to this point, Petty had stoutly refused to consider the exactions of the settlement anything but the just deserts of rebellion. As recently as 1685 he had scolded the Bishop of Ferns and the author of the *Twelve Quaeries* for suggesting otherwise. Other than arguing that the wholesale removal or total extirpation of the Irish was against English interests – an argument hardly motivated by sympathy with the Irish – Petty had done nothing to suggest he saw the settlement as unjust, though flawed in its execution and hampered by inconsistencies. The answer seems to be that he feared worse from Tyrconnell than mere modifications or even large-scale retrenchments, and he recognized that the only sure way to stop Tyrconnell, given the apparent eclipse of Irish Protestant political power

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[520] BL MS Add. 72885, ff.15-16. Another paper marked "Vade mecum May 1686" (BL MS Add. 72885, f.1) mentioned a "retrenchment of thirds" – a repetition of the retrenchment in Protestant settlement claims attempted after the Restoration.

[521] See for instance "Considerations Leading to pitch upon a Sum of Mony for remedy of Evills & Wrongs arising from & consequent to the Act of Settlement and Explanation" (BL MS Add. 72882, ff.25-30), "An Undertaking how to pay 600,000 pounds in Remedy of Wrongs to provide for the Catholic Clergy forthwith, and for the Catholiq & Protestant Clergy after the present Protestant Incumbents" (BL MS Add. 72882, ff.31-32), and "A Proposal how the English may Buy Out the Interest of the Irish Papists in Ireland and Advance the Roman Catholique Interest in England" (*Petty Papers*, 1:64). As with Petty's ideas about religion and much else, his revision of the settlement is spread over a number of papers rather than articulated thoroughly and at length in any one place.

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at the Court of James II, was to change his mind. Petty set forth some of his fears in "A Dialogue of Ireland" between his customary mouthpieces, "A" and "B":

> A. What News of Ireland?
> B. They say It shall bee governd by the Kings Lieut[enant] and 12 Irish Catholiques, according to the Articles made in 1648, as to forces, Revenue, Religion, repealing old and making new Lawes &c., pardoning all done amisse Anno 1641.
> A. By that Method, all that was done & intended Anno 1641, will bee justifyed and allowed.
> B. And Ireland will bee thereby made an Asylum and Security for all his Majestys Catholiq friends in the world, in Case his Majesty in his life time should faile to protect them, or in Case his successor should bee hard upon them.
> A. Why then all Protestants ought to bee disarmd there, and a full Army of Irish Catholiq's putt into pay. The Church Livings transferred to Catholiques; The Judges, Sherrifs & Justices of Peace & officers of the Revenue to bee all Catholiques, and most of the English stript of their Lands and scarse any tolleration given to the exercise of any Religion, but Catholiques.[522]

By making Ireland a Catholic "asylum" and driving Protestants from Ireland, Tyrconnell would destroy the basis of "proportionable mixture" between different populations that alone could secure peace within the Three Kingdoms and strength without. Among Petty's "17 arguments against the Lord Tirconells design" were that it would "Drive away the English", provoke and perhaps justify "fear of the French", remove any "meenes of Union", and even introduce the "Danger of Democracy".[523] Or, as Petty warned in "A Memento to the Lord Tirconell", such moves would ultimately "Endanger the Catholics of England", and ultimately bring about "The Extirpaton or Slavery of the Irish Nation language & Religion & that Irrecons[il]ably", because

[522] BL MS Add. 72882, ff.41-42, f.41.

[523] BL MS Add. 72882, f.67.

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> The Princesse of Orange, & Princesse Anne & Prince of Orange are not willing That Ireland should bee retrencht from England, Nor that the Pope should have [a] share in the English Empire. Whoever attempts these things may bring a War upon the King from Holland &c.[524]

Though Petty did not live to see it, this is not a bad description of what finally happened.

To prevent it, he counseled the large-scale transplantation of Catholics into England. In Ireland this might continue to encourage the transmutation of the Irish into English, but working now, as it were, from the demand rather than the supply side, lessening the proportion of Catholics rather than increasing that of Protestants.[525] In England it would encourage a new process of "Catholication", increasing the ratio of Catholics to Protestants from one in three hundred to one in eighteen or perhaps one in twelve.[526] In one relatively famous proposal this took the form of turning Ireland into a giant cattle-farm, moving virtually all its people to England while staffing the "farm" with Protestants. Interpretations of this have understandably focused on what it says about English views of Ireland and the colonies, but there is reason to think, given the context of the other proposals he produced at the time, that Petty also had the population of England, which would be considerably "Catholicated" by it, in mind.[527] "The State & Settlement of Ireland

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[524] BL MS Add. 72885, f.2.

[525] He also proposed – as earlier – corollary changes of a more familiarly institutional nature, such as reorganizing the army by "exchanges" of troops – Irish in England and Scotland, English and Scottish in Ireland – as well as of priests. See, e.g., BL MS Add. 72888, ff.65-66.

[526] "7 Distinct Proposals concerning Ireland and Religion" (1686), BL MS Add. 72882, ff.51-52.

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considered" argued that with religious contention removed, Ireland would be secure from French invasion.[528] Petty stressed the potential benefits of greater Catholic numbers for both England and Ireland, and especially for their union.[529] Petty focused more and more on the political anatomy of religious division throughout Three Kingdoms;[530] he created in his last proposals a new transmutative political arithmetic to go with it, whose chief locus would be not Ireland but England. This, he thought, would be the only way to secure James II's authority and to hold the English Empire together; without it, the Three Kingdoms would be open to invasion from without and rebellion from below. Petty died in December 1687, before these fears could be realized.

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[527] See "A Probleme", in *Petty Papers* 1:64-67; "Questions and assertions ariseing from & depending upon the Maine question of Transporting a Million of people out of Ireland into England" (c.1686), BL MS Add. 72882, ff.59-62.

[528] BL MS Add. 72882 ff.43-46.

[529] See, e.g., "Advantages in particular to Ireland by the Transplantation and other practises within mentioned And in generall to the King, all his Kingdoms and subjects" (c.1686), BL MS Add. 72882 ff.65-66.

[530] In papers such as "An Estimat of the Protestants, Papists & Dissenters in England & Wales" (1686), BL MS Add. 72888, ff.77-78, or "Of the Proportions of Religionaryes In England & Wales, Scotland, Great Brittaine" (1686), BL MS Add. 72888, f.79.

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6: Political Arithmetic after 1688

William Petty died unexpectedly in December 1687, at the age of sixty-four. At the moment of his death he was at the height of his powers, producing manuscript proposals faster than ever, elaborating what he called "political arithmetic." Between 1670 and 1687 political arithmetic was an evolving piece of "political medicine", a recipe for "the transmutation of the Irish into English" by a series of specific demographic manipulations: exchanges of Irish and English women, intermarriage between English women and Irish men, and the reorganization of Irish households around their new English mistresses. To be sure, Petty himself had expanded its scope, in manuscripts extending political anatomy across the Atlantic and transmutative political arithmetic itself to Britain, though here it remained essentially the same kind of program. Further, Petty's short printed works on population in the 1680s began the process by which the phrase "political arithmetic" began to acquire a broader, and shallower, meaning. But until he died, Petty remained deeply invested in the transmutative political arithmetic worked out in his manuscript proposals; indeed, to judge by the scale of his production and the political reach of his ideas, there is every reason to think that his hopes were highest in last months of his life. With Petty's death, transmutative political arithmetic abruptly disappeared.

What replaced it was determined by more than the fact of his death, however. The "Glorious Revolution" of 1688-1689 and the Williamite invasion of Ireland in 1690-1692 changed forever the political context in which Petty had lived, worked and thought. What survived of his work seemed to apply the term "political arithmetic"

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not to Ireland's specific problems but to demographic and other statistics generally, at a moment when new sources of such statistics were becoming available and their importance was newly appreciated. In these circumstances, Petty's phrase become a convenient label for all sorts of data handling, and particularly for the gathering and analysis of economic information for the burgeoning fiscal-military state during the Nine Years War. In one sense, political arithmetic's boundaries expanded and blurred. In an age of party politics, political arithmetic went from manuscript into print, from private coteries to a public readership, from the virtuosi (or one virtuoso) to merchants and bureaucrats.

In a sense, however, the political arithmetic of the 1690s and early 1700s was narrower and less ambitious than that of the 1670s and 1680s. The second generation of political arithmeticians was chiefly, in some cases exclusively, interested in quantifying and maximizing the resources of the state, considered primarily as a war machine or as the regulator of trade. The method and language of quantification which adorned *Political Arithmetick* was central; the spirit that animated the manuscript proposals was forgotten, or never known. Even had it been remembered, times had changed. Petty's goal of transmuting the Irish and uniting them with the English was no longer relevant. Finding ways of reconciling the English people to a Catholic king was unnecessary once James had fled and a Protestant succession was secured. These goals had made Petty's political arithmetic what it was. Once they were abandoned, it was no longer a transmutative program but, at best, an administrative instrument, and at worst, a language of commercial propaganda. It

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helped bureaucrats and merchants marshal numerical data, but by itself it told nobody what to do, or why.

In this final chapter I will try to sketch the contours of political arithmetic after Petty, and to indicate some of the things that shaped it. The most elementary of these is the reception of Petty's political arithmetic and of Petty himself, and as will become evident the two quickly diverged. As the second generation of political arithmeticians – Gregory King and Charles Davenant most prominent among them – made their own political arithmetic, they came to feel ambivalent about Petty's dual legacy of appealing rhetoric and appalling practice. In any case, they had other imperatives and other preconceptions than Petty's. They sought and created an abstract, precise, probabilistic, analytical political arithmetic – a new kind of calculation. The end of transmutative political arithmetic was over-determined: it was no longer available, no longer relevant, and no longer appealing. It was a lost alternative of pre-1688 politics, born of a particular moment in the politics of religion and the ideology of empire that had definitively passed.

Petty after 1688

The most obvious constraint operating on contemporary understandings and interpretations of political arithmetic after 1688 was the availability of Petty's work. Here the crucial fact is that none of Petty's manuscripts were available, at least to any of those who styled themselves his heirs. A large number of his papers were in the hands of Robert Southwell; a few others were and remain among the papers of Samuel Pepys, Peter Pett and other contacts of Petty's or at the Royal Society. But

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even those that had circulated in his lifetime among people who survived him do not seem to have been much read after his death – or if they were, by whom and with what results is not recorded. At any rate, they do not seem to have been made available to King, Davenant and the rest of the big names of subsequent political arithmetic. This means that what this second generation knew of Petty's work must have been limited to what was available in print.

Some of this was material that Petty himself had seen through the press, often what would later be seen as the core of his economic work. The *Treatise of Taxes*, which had been printed in Petty's lifetime (1662), was widely available after his death. The *Treatise* had seen four editions by 1685 (1662, 1667, 1679, 1685) and was printed again in 1689 and 1690.[531] The *Quantulumcunque Concerning Money* (written in 1682) appeared in 1695 and would reappear in 1748 and 1760.[532] Miscellaneous other works recurred – his "History of Dyeing", for instance, since it was included in Sprat's *History of the Royal Society* (1667, 1702, 1722),[533] enjoyed a long life in print – while others, like the once contentious *Treatise Concerning the Use of Duplicate Proportion* (1674), gradually faded from memory. Occasionally, manuscripts came to light: *Verbum Sapienti*, which had existed since 1680 at least, first appeared in 1691 with the first edition of *The Political Anatomy*;[534] the "Treatise

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[531] See *EW*, 634-637. In 1689 it appeared as *A discourse of taxes and contributions...*; in 1690 as *A Treatise...*, printed in *A collection Of three state tracts* (both London).

[532] Petty, *Quantulumcunque Concerning Money* (London, 1695). See *EW*, 638-640.

[533] *EW*, 637.

[534] Petty, *The Political Anatomy of Ireland. With The Establishment for that Kingdom when the late Duke of Ormond was Lord Lieutenant. Taken from the Records. To which is added Verbum Sapienti; or an Account of the Wealth and Expenses of England, and the Method of raising Taxes in the most*

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of Naval Philosophy", never more than a skeleton, was printed in 1691 and again in 1693.[535] But none of Petty's philosophical or scientific work was reprinted on its own in the eighteenth century.

Instead, for the century or so after Petty's death, the work that almost certainly defined him was *Political Arithmetick*, which first appeared in print, with Elizabeth Petty's approval, in 1690. A corrupt version had already appeared illicitly in 1683; his widow only consented to an authorized printing out of fear of further piracy and on her cousin Southwell's advice. The book was reprinted twice in 1691. In 1699 it appeared with Petty's other works on population (the *Essay Concerning the Multiplication of Mankind*, *Further Observations upon the Dublin Bills of Mortality*, *Two Essays in Political Arithmetick*, *Observations upon the Cities of London and Rome*, *Five Essays in Political Arithmetick*) as *Several Essays in Political Arithmetick*. This volume, the *Economic Works* of its day, was reissued in 1711, and much later in Edinburgh in 1751 and London again in 1755. A Dublin edition of *Tracts; chiefly relating to Ireland* in 1769 bundled it with the *Treatise of Taxes* and *The Political Anatomy of Ireland*, the latter of which had appeared first in 1691 and again in 1719.[536]

The reader of the 1690s or early 1700s might have had access to Petty's opinions on a wide range of questions, though taxation and commercial policy clearly loomed largest among them, and his ideas about population, however widely

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Equal Manner. Shewing also, That the nation can bear the Charge of Four Millions per annum, when the occasions of the Government require it (London, 1691).

[535] In 1691 in *An account Of several New Inventions and Improvements Now necessary for England...*; in 1693 as *What a Compleat Treatise of Navigation should contain* (both London). *EW*, 648.

[536] *EW*, 648-650.

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available, faced increasing criticism both from abroad and at home. But his ideas on subjects like Ireland and population were now presented in such a way that they seemed inseparable from his economic ideas and perhaps subordinate to them. The lengthy descriptive subtitle affixed to *Political Arithmetic* in 1690 brings this home: it lists economic topics, not political issues, and Ireland is never mentioned. An equally striking case is the juxtaposition in one volume of the first printed edition of *Political Anatomy* – the text in which Petty's transmutative agenda had been most lucidly explained – with the previously unpublished *Verbum Sapienti*, billed as

> an Account of the Wealth and Expenses of England, and the Method of raising Taxes in the most Equal Manner. Shewing also, That the nation can bear the Charge of Four Millions per annum, when the occasions of the Government require it.

Readers would naturally have drawn the conclusion that these volumes were, as their newly elaborate titles suggested, chiefly and equally concerned with "wealth" and "expenses", and the charge the government could bear. These were, after all, pressing issues.

More important even than this recontextualization is the decontextualization that preceded it. Any political import Petty's works may have had when written would have been diluted by the passage of time and events; as Shelburne's preface inadvertently showed, *Political Arithmetick* appeared in print in circumstances very different from those in which it had been composed. Further, unlike the manuscripts, the printed works attached the phrase political arithmetic loosely to ideas about population, taxation and commerce. The real political intent behind Petty's political arithmetic – the whole substance of *transmutative* political arithmetic – remained in

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manuscript. The hint of it that did get into print, in the fifth chapter of *Political Arithmetick* and the fifth and sixth chapters of *Political Anatomy*, provided only the barest of clues to his original purposes.

This alteration in the significance of the Petty corpus is confirmed both by the aspects of it that tended to be picked up on and by the heterogeneous purposes it was made to serve by most of those who cited it. This may not be very surprising in the case of the *Discourse Concerning the Use of Duplicate Proportion*, an impressively wide-ranging text to begin with. Different chapters of the work attracted the attention of writers on subjects as diverse as shipbuilding, valuing insurance and buying furniture. In *The City and Countrey Purchaser, and Builder's Dictionary*, Richard Neve used it as a guide to pricing mirrors.[537] Drawing on Petty's "Eleventh Instance", which dealt with the proportional relationship between age and life-expectancy, John Ward criticized some of Petty's conclusions in the course of discussing the calculation of annuities in his *Clavis Usurae* (1710).[538] William Sutherland, in *The Ship-Builder's Assistant* (1711), used an earlier chapter of Petty's book as the starting-point for talking about the different amounts of timber needed for different classes of ship.[539] These practical applications were exactly what Petty had claimed to intend for the *Discourse* when he wrote it.[540] Nevertheless it is interesting that

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[537] [Richard Neve], *The City and Countrey Purchaser, and Builder's Dictionary: Or, the Compleat Builder's Guide* (London, 1703), 153.

[538] John Ward, *Clavis Usurae; Or, A Key to Interest, both Simple and Compound* (London, 1710), 105-107.

[539] William Sutherland, *The Ship-builders Assistant; Or, some Essays Towards Compleating the Art of Marine Architecture* (London, 1711), 33-34.

[540] See Petty, *Discourse Concerning the Use of Duplicate Proportion* (1674), preface.

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whereas in the 1670s it had elicited spirited responses on a philosophical level from Thomas Barlow, Bishop of Lincoln, and from Petty's own friend Sir Robert Wood, no one any longer engaged visibly with the more abstract ideas in the text, let alone with the atomic theory laid out in the appendix. Petty, here as elsewhere, was reduced to a source of numbers.

Indeed, easily the most popular use of Petty's work was as a source of information on the size, growth, and (as in Ward) age-structure of various populations. This was not merely an artifact of the rise of insurance.[541] Older disputes, notably over the relative sizes of London, Paris, and Rome, dragged on. William Nicolson used Petty ("one of the most eminent Mathematicians and Virtuoso's of this Age") as his authority for London's preeminence in *The English Historical Library* (1696),[542] and de Souligné's references to Petty in his 1706 *A Comparison between Old Rome... and London*[543] continued the debate between Petty and various members of the Académie des Sciences begun in 1686.[544] Petty was also used for simple illustration. John Beaumont's *The Present State of the Universe* (1694) quoted Petty's comparison of the populations of London, Paris and other

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[541] Though besides Ward (cited above), the Friendly Society used Petty's estimates in calculating insurance rates: see *Land Security, for Establishing a Perpetual Insurance upon Lives, Of Men, Women, and Children, &c.* (London, 1715), 30 [i.e. 28].

[542] William Nicolson, *The English Historical Library: Or, a Short View and Character Of most of the Writers Now Extant, either in Print or Manuscript; which may be Serviceable to the Undertakers of a General History of this Kingdom* (London, 1696), 47-48. Nicolson also (48) described Petty as "the Chief Director and Author" of Graunt's *Observations*.

[543] De Souligné, *A Comparison between Old Rome In its Glory, As to the Extent and Populousness, and London, as it is at Present* (London, 1706), 25. On Petty and Adrien Auzout, his most persistent critic, see *EW*, 522-523 and Hull's footnotes to *Five Essays in Political Arithmetick*, *EW*, 525ff.

[544] Most references to Petty in French works pertain to the populations and relative sizes of London, Paris and/or Rome; see the reference to Misson below. Petty's initial response to Auzout's challenge is in the Royal Society Library, MS Classified Papers (1660-1740) XVII: Miscellaneous Papers, item 24.

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European cities past and present as a matter of geographical interest.[545] Maximilien Misson, criticizing Marco Polo's claims about the size of Chinese cities, offered Petty some rather oblique praise: "Likely [Petty] had no great faith for [Polo], for else he would not have said... that London is the largest, and most populous City in the World."[546] Whatever their attitude to Petty, these authors agreed that what made him interesting were his population estimates.

Another relatively frequent and enduring use of these estimates, which Petty himself had foreseen, was "To justifie the *Scriptures* and all other good *Histories* concerning the *Number* of the People in Ancient Time."[547] In *A Conference with a Theist* (1696), William Nicholls used Petty's demonstration of consistent population increase as his third argument against the infinity of the world, while disputing Petty's estimate of current world population as far too small.[548] Later that year William Whiston, in the appendix to *A New Theory of the Earth*,[549] followed Nicholls

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[545] [John Beaumont], *The Present State of the Universe, Or an Account of I. The Rise, Births, Names, Matches, Children and near Allies of all the present Chief Princes of the World. II. Their Coats of Arms, Motto's, Devices, Liveries, Religions and Languages. III. The Names of their Chief Towns, with some Computation of the Houses and Inhabitants. Their Chief Seats of Pleasure, and other Remarkable things in their Dominions. IV. Their Revenues. To which Are added some other Curious Remarks; as also an Account of Common-Wealths, relating to the foregoing Heads* (London, 1694), 41-43.

[546] Maximilien Misson, *A New Voyage to Italy* (4th edition, London, 1714), 24. The reference to Petty does not occur in the first edition (London, 1695) and I have been unable to consult the intervening editions.

[547] Petty, *Another Essay in Political Arithmetick* (London, 1682), 19.

[548] William Nicholls, *A Conference with a Theist* (London, 1696), 66ff, esp.73-76.

[549] William Whiston, *A new theory of the Earth, from its original to the consummation of all things wherein the creation of the world in six days, the universal deluge, and the general conflagration, as laid Down in the Holy Scriptures, are shown to be perfectly agreeable to reason and philosophy* (London, 1696), 383-388. It may be worth noting that Whiston earlier makes several references to relationships of "duplicate proportion" in the heavens without once mentioning Petty's work on the subject.

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in citing Petty's *Multiplication of Mankind* and *Another Essay in Political Arithmetick* as sources for the history of human population, while arguing against Petty that population had doubled throughout postdiluvian history at a constant rather than a constantly increasing rate. Two decades later, George Cheyne wrote in a similar vein:

> Sir *William Petty*, from Observations on Births and Burials has discover'd, that in 360 Years the Mass of Mankind is doubled in these Countries. Had they thus increas'd from all *Eternity* in other Countries, all the *Planets* within our *System* had not been able to have contain'd them by this time; yea, if in many *millions* of Years they had but increas'd by an Unity continually, their Number had been infinite by this time. But it's plain, both the Number of Mankind, and that of other *Animals* and *Vegetables*, must have perpetually increas'd, if the World has been from all *Eternity* as it is at present. And since their Number is but finite at present, it's evident, this World has not been forever as it now is. And indeed the present Number of Animals does answer very well to the common *Aera* of the Creation.[550]

It is tempting to credit Petty's influence in propagating this form of numerical argument, but by now such argument was becoming commonplace quite independently of Petty's name or numbers. At the very least, he must share the credit with several of his contemporaries. A more plausible judgment from the available evidence is that Petty, in print, had become just one of many sources of data – sometimes useful, sometimes less so – about the size and history of populations. This tendency can only have been bolstered by the fact that while his more economically- and statistically-oriented works were available in several editions in the 1690s and

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[550] George Cheyne, *Philosophical Principles of Religion: Natural and Revealed: In Two Parts. Part I. Containing the Elements of Natural Philosophy and the Proofs of Natural Religion arising from them. The Second Edition Corrected and Enlarged. Part II. Containing the Nature and Kinds of Infinites; their Arithmetick and Uses: together with the Philosophick Principles of Reveal'd Religion* (London, 1715), 174.

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early 1700s, hardly any of the work which underpinned the original political function of these numbers was reprinted, or had ever been printed in the first place. Some of Petty's theological proclivities still attached to his work on populations, and may even have found (in the age of physico-theology) a larger audience than in his lifetime. But his politics, as far as most of his readers went, had disappeared.

Political Arithmetic in print

At the same time as Petty's work was losing its original political meaning, the phrase "political arithmetic" and the book *Political Arithmetick* flourished as never before. The explanation of this seeming paradox is contextual, or rather intertextual. Petty's original audience read *Political Arithmetick* and *Political Anatomy* (themselves in manuscript) as a preface to a long series of manuscript proposals for "the transmutation of the Irish into English"; it would have been natural to relate the former to the latter in a specific way. But for readers of the print editions, the two books were accompanied not by proposals for transmutation but by tracts on population, coinage and taxation. In such surroundings they looked very different: much more like other contemporary works on commerce than radical programs of social engineering. What stood out was no longer their aims but their language, which, absent the proposals for transmutation, was the language of numbers. Through the 1690s, political arithmetic – once described by Petty as "the political medicine" of Ireland – was redefined not only by non-specialists like Nicholls or Nicolson, but also, more enduringly, by a small number of increasingly specialized writers on economic matters.

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This process of redefinition began with a narrowing of focus. In *A Proposal for Improvement of Husbandry and Trade* (1691), John Houghton (a Fellow of the Royal Society) suggested systematically gathering data on weights, measures, and commodity prices, trade policies of other nations, as well as compiling histories of trade and – "for the *Political Arithmeticians* that desire to know the *Increase* and *Decrease* of Places" – tracking population change in the localities.[551] Houghton's project, strongly reminiscent of Hartlib's "Office of Address" and the Royal Society's earlier "history of trades" project, was similarly close in spirit to many of Petty's ideas; in fact, the proposal was signed by many of Petty's former colleagues and friends, including Peter Pett, Robert Southwell, John Evelyn, and Anthony Deane.[552] Houghton was not suggesting anything particularly new; he was merely applying the name of political arithmetic – as Petty in his last printed works had done – to questions of population generally rather than to any specific political context.

John Arbuthnot's 1692 *Of the Laws of Chance*, while not actually employing the phrase "political arithmetic", showed a familiarity with both Graunt and Petty. Though most of the book was a translation of Christiaan Huygens's *De ratiociniis in ludo aleae* (1654), Arbuthnot's preface was original and very suggestive, connecting arithmetic and probability with politics in a way analogous to Petty, but more self-consciously abstract.[553] When people spoke of chance, Arbuthnot argued, they revealed "nothing but want of Art"; ignorance of the physical causes that assuredly

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[551] John Houghton, *A Proposal for Improvement of Husbandry and Trade* (London, 1691), 1.

[552] Houghton, *A Proposal for Improvement*, 2.

[553] See Angus Ross, "Arbuthnot, John (*bap.* 1667, *d.* 1735), in *Oxford DNB* [http://www.oxforddnb.com/view/article/610, accessed April 17, 2005].

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governed all events. Probability, "the Laws of Chance", rolled back this ignorance and offered a basis for rational calculation.[554] The progress of human knowledge was the expansion of the empire of mathematics into every new field:

> There are very few things which we know, which are not capable of being reduc'd to a Mathematical Reasoning, and when they cannot, it's a sign our knowledg of them is very small and confus'd; and where a mathematical reasoning can be had, it's as great folly, to make use of any other, as to grope for a thing in the dark when you have a Candle standing by you.[555]

Mathematics was the tool of choice wherever available, including in politics:

> [A]ll the Politicks in the World are nothing else but a kind of Analysis of the Quantity of Probability in casual Events, and a good Politician signifies no more, but one who is dexterous at such Calculations[.][556]

Petty, Hobbesian that he was, would hardly have disagreed with the sentiment behind this. Yet Arbuthnot's stress on the discovery of laws contrasted with Petty emphasis on the habit of practice, made clearest in his tennis-court critique of Coke's "political geometry". Politics was becoming a science; for Petty it had still been an art.

What Arbuthnot then says about how exactly probability may be brought to bear in social and, implicitly, political situations is very interesting because of the way it employs and abstracts from the sort of demographic categories and proportions

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[554] John Arbuthnot, *Of the Laws of Chance, or, A Method of Calculation of the Hazards of Game, Plainly demonstrated, And applied to Games at present most in use, Which may be easily extended to the most intricate Cases of Chance imaginable* (London, 1692), preface.

[555] Arbuthnot, *Of the Laws of Chance*, preface.

[556] Arbuthnot, *Of the Laws of Chance*, preface.

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Petty drew attention to. He begins with demographic commonplaces drawn from Graunt and Petty's observations on the bills of mortality.

> There is... a Calculation of the Quantity of Probability founded on Experience, to be made use of in Wagers about any thing; for example, it is odds, if a Woman is with *Child*, but it shall be a *Boy*; and if you would know the just odds, you must consider the Proportion in the Bills that the Males bear to the Females: The Yearly Bills of Mortality are observ'd to bear such Proportion to the live People as 1 to 30, or 26; therefore it is an even Wager, that one out of thirteen, dyes within a Year... because, at this rate, if 1 out of 26 dyes, you are no loser.[557]

This, again, is nothing that could not be read in, or at least into, Petty's printed work. But without batting an eye, Arbuthnot goes on to apply the same reasoning to a very different sort of demographic category: "It is but 1 to 18 if you meet a *Parson* in the Street, that he proves to be a *Non-Juror*, because there is but 1 of 26 that are such."[558] Probability, applied to political arithmetic, allowed one to juggle with any kind of demographic categories and for any reason (Arbuthnot went on to joke that "It is hardly 1 to 10, that a *Woman* of Twenty Years old has her *Maidenhead*").[559] It was connected to politics not by its unique aptness for a specific problem but rather through its applicability, given sufficient quantitative information, to anything.

Arbuthnot made explicit a level of abstraction that Petty had usually only implied. But what really made Arbuthnot's political arithmetician different from Petty was not the superficially greater range of categories he handled or his apparently arbitrary reasons for doing so but where these reasons came from, and the point at

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[557] Arbuthnot, *Of the Laws of Chance*, preface.

[558] Arbuthnot, *Of the Laws of Chance*, preface.

[559] Arbuthnot, *Of the Laws of Chance*, preface.

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which they entered the process of calculation. As much as Arbuthnot claimed for probability, he was careful, when he applied it to politics, to distinguish between the act of calculation and the principles that guided it. However dexterous the political calculator, "the Principles which are made use of in the Solution of such Problems, can't be studied in a Closet, but acquir'd by the Observation of Mankind."[560] For Arbuthnot, the numbers were given; what one did with them was decided on the basis of experience. For Petty, on the other hand, it was precisely the principles which *could* be studied in a closet – or a laboratory. Petty's political arithmetic only made sense because the goal of transmutative union was pre-specified. It was the numbers which were yet to be worked out, empirically but with constant reference to the guiding aim.

A true account of the nation

Thus, as Petty came to be seen as simply the "best computer of his time", so political arithmetic came to signify a practice of computation: usually, the analysis of quantitative accounts of national demography. Both tendencies are clearly marked in one of the major sources for late seventeenth-century political arithmetic, the "LCC Burns Journal", one of two survivors of perhaps more than fifty notebooks kept by Gregory King, probably between 1695 and 1700.[561] In the historiography of political

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[560] Arbuthnot, *Of the Laws of Chance*, preface.

[561] A facsimile reproduction of King's notebook, "'The LCC Burns Journal': A manuscript notebook containing workings for several projected works [c.1695-1700]" is available – along with a reproduction of Graunt's *Observations* – in Peter Laslett (ed.), *The Earliest Classics: John Graunt and Gregory King*, (n.p., 1973).

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arithmetic, King's is a prominent name, although the man himself remains obscure:[562] "a skilful herald, a good accomptant, surveyor, and mathematician, a curious penman, and well-versed in political arithmetick."[563] Like Petty he is to this day an important source for the demographic history of the period; also like Petty, his most interesting work was never printed but remained in manuscript, sometimes in brief proposals which can be identified as state papers, sometimes – as with the "Burns Journal", which is suggestively marked "no.51" – as more probably private. In the form his work took, King illustrates the transition between Petty and King's friend Charles Davenant, whose political arithmetic was printed. In his conception and articulation of political arithmetic, too, King marks a change.

The notebook shows a thorough knowledge of Petty's printed work on population. In a section entitled "General Propositions touching the Number of People", King noted that

> Sr Will. Petty in his Treatis of Duple Proportion, printed anno 1674 gives several Instances of the operation of Duple Proportion & among the rest p. 82 His 11th Instance is, in the life of man and its duration.[564]

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[562] As far as I know there is no full-length study of King. See instead Julian Hoppit, "King, Gregory (1648-1712)", in *Oxford DNB* [http://www.oxforddnb.com/view/article/15563, accessed 17 April 2005]; Peter Laslett, "Introduction", in Laslett (ed.), *The Earliest Classics*, [1-10]; Geoffrey Holmes, "Gregory King and the Social Structure of Pre-Industrial England", in Holmes, *Politics, Religion and Society in England, 1679-1742* (London, 1986), 281-308; Negley B. Harte, "The Economics of Clothing in the Late Seventeenth Century", *Textile History*, 22:2 (1991), 277-296; Laslett, "Natural and Political Observations on the Population of Late Seventeenth-Century England", in Kevin Schurer and Tom Arkell (eds.), *Surveying the People: The interpretation and use of document sources for the study of population in the later seventeenth century* (Oxford, 1992), 6-30; Hoppit, "Political Arithmetic in Eighteenth-Century England", *Economic History Review* 49:3 (1996), 516-540. King's possible relationship to the Marriage Duty Act of 1695 is discussed in Colin Brooks, "Projecting, Political Arithmetic and the Act of 1695", *English Historical Review* 97:382 (1982), 31-53, and touched on more recently in Paul Slack, "Government and Information in Seventeenth-Century England", *Past and Present* 184 (2004), 33-68.

[563] Monument to Gregory King in the Church of St. Benet, Paul's Wharf, London, quoted in Harte, "The Economics of Clothing", 277.

[564] King, "Burns Journal", 21.

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King went on to summarize Petty's chapter and make notes on the way he had argued it. Another section, "Of England and London", revealed more of King's attitude to Petty and to the purpose of political arithmetic:

> Sr William Petty was lookt upon as the best Computer of his time, But in all his Computations of the Numbers of People in England and London, It is Evident he designd to Represent both the one and the other much greater then they truly were[.][565]

Later King wrote that Petty's claim about the size of London "seems to be with a Design to magnify London beyond its true Value."[566] As we have seen, it was not unusual to regard Petty as "the best Computer of his time".[567] Thanks in large part to King's own criticisms and their influence on Davenant, the second judgment, that Petty deliberately inflated his numbers, would also become standard. What makes King's critique of Petty so interesting is his idea of *why* (and for whom) Petty had exaggerated his estimates.

King had no doubt that Petty had done this intentionally,

> And tho Writing to the Publick might make it Excusable so to do, yet least those Publick accounts of His should be too much Rely'd on by those who sit at the Helm, to whom a true Account of the Kingdom is more necessary then to others, I shall endeavour to give such an Account....[568]

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[565] King, "Burns Journal", 49.

[566] King, "Burns Journal", 63.

[567] The phrase originated with Ormond, who referred to Petty as "our best Computer" (while misquoting his actual estimates) in a letter to Southwell. I see no reason to think that King did not simply reinvent it, though when Davenant used it (see below) he probably got it from King.

[568] King, "Burns Journal", 49.

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The irony of this is that Petty's most important political-arithmetical proposals had *not* been written "to the Publick" but precisely for "those who sit at the Helm", and that for Petty a "true Account of the Kingdom" had had less to do with absolute numbers than with relative proportions. King's notion of political arithmetic's relationship to the state was probably closer to Petty's than King realized. Both produced political papers never meant for print, though King did not necessarily know this.[569] But their ideas about what made political arithmetic serviceable to the state diverged significantly. Petty was so seemingly careless with his numbers because he was not trying to give an accurate picture of a current state of affairs so much as to suggest ways of altering it – after throwing out a few round numbers he tended to move on to the policy ideas that interested him, namely, his program for the transmutative union of the English and Irish. King, on the other hand, saw the entire task of political arithmetic in terms of numerical accuracy. Like any other source of information, it could help policymakers – perhaps more efficiently and systematically than any other existing source. But it would not, of itself, inspire policy goals. In fact, just in order to be useful in making policy decisions, political arithmetic had to provide information that was unimpeachably *apolitical.*

This altered conception explains why so much of King's political arithmetic so closely resembled Petty's (and John Graunt's) *printed* work, and why none of it

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[569] King seems to have known little about Petty's manuscript work. His notes on *Political Arithmetick* ("Burns Journal", 181-187) record that it was "writ about 1676 but published... 1690" (181). In fact, manuscripts were in circulation in both England and Ireland in 1671-1672. King's easy equation of printing with publishing, like his reading of Petty's motives, suggests that he may not have been aware of Petty's coterie circulation of manuscripts at all.

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even remotely approached the boldness of Petty's manuscript proposals. King's *Natural and Political Observations and Conclusions upon the State and Condition of England* (1696), whose title clearly echoes Graunt's *Natural and Political Observations upon the Bills of Mortality*, was evidently meant for the press but remained in manuscript until 1802.[570] It was in effect a *Political Anatomy* for England and updated many of the elements of both *The Political Anatomy of Ireland* and *Political Arithmetick*. The first section dealt with "The Number of People in England and Wales, calculated from the Assessments on Marriages, Births, and Burials",[571] the second with "The Proportion of England, in Acres, and People, to France, and Holland, to Europe, and to the World in general",[572] and later sections with the age, sex and social structure of the population as well as with estimates of annual income and consumption, with constant reference, as in Petty's *Political Arithmetick*, to France and Holland.

Yet despite these striking formal and structural similarities, King distanced himself from Petty's example by disavowing the tradition of patriotic exaggeration in "all former calculations of this kind". He affirmed that his own numbers, gathered – despite their political purposes – in a spirit of scientific neutrality, "come very near the truth".[573] Petty, as King's readers might recall, had only claimed that his figures were "not so false as to destroy the argument they are brought for."[574] In stark

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[570] Harte, "The Economics of Clothing", 277.

[571] King, *Natural and Political Observations and Conclusions on the State of England* ([1696] London, 1802), 33-36.

[572] King, *Natural and Political Observations*, 36-38.

[573] King, *Natural and Political Observations*, 31.

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contrast, King made no mention of *having* any "arguments" to make at the outset, and in the context of his preface any such acknowledgement would have been anathema, both intellectually and, one suspects, morally:

> If, to be well apprized of the true state, and condition of a nation, especially in the two main articles, of its people, and wealth, be a piece of political knowledge, of all others, and at all times, the most useful and necessary; then, surely at a time when a long and very expensive war against a potent Monarch, (who, alone, has stood the shock of an alliance and confederacy of the greatest part of Christendom), seems to be at its crisis; such a knowledge of our own nation must be of the highest concern[.][575]

In time of war, with the fate of the nation at stake, what was needed was an accurate picture, not a clever argument.

Just those sections of King's book that most explicitly addressed the political questions – or question – of the day bore out this picture of the political arithmetician as analyst. The key section was neutrally entitled "The State of the Nation, Anno 1695",[576] and straightforwardly projected a decrease in state revenue based on current trends, leading King to conclude that "the war cannot well be sustained beyond the year 1698 upon the foot it now stands, unless" revenues increased, expenses decreased, a new source of credit was found, "the state of the war [was] altered" by a new alliance or a change of fortune, or the excise brought in.[577] Political arithmetic

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[574] Petty, *Political Arithmetick*, preface.

[575] King, *Natural and Political Observations*, 31.

[576] King, *Natural and Political Observations*, 61-63.

[577] King, *Natural and Political Observations*, 62.

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counted resources and determined the full range of probable options, but by itself it did not choose among them.

At the same time and by the same token that he enforced a disinterested political arithmetic, King created a political arithmetic neutral as to subject matter. Far from specifying a method of solving a unique sort of political and cultural problem – let alone, as in Petty, specifying both problem and solution – political arithmetic now came to signify virtually any act of mathematical calculation made in any identifiably political or economic context. It could therefore apply to an astonishing range of things; such universal applicability might even certify the value neutrality Petty had evidently lacked. King's papers offer admirable testimony. A bundle of his "Exercises in polit[ica]l Arithmetic" preserved in the National Archive includes, among other things, "An accompt of the Receipt of the Publick R[e]venue at the Exch[eque]r from 28 Sept. 1701 to 26 Dec. following",[578] a proposal for a "Tax upon Windows",[579] "An Extract of the Number of Houses and People from the Assessment upon Marriages Births and Burials Anno Domini 1695",[580] a manuscript booklet containing "The Names of the People in Harfield near Uxbridge in Co[unty] Midd[lese]x. with their ages. Taken the latter End of Oct 1699",[581] a "Scheme of the Charge of Settling 2000 Palatines in Martin Meer",[582] and various scribblings on population, including more notes on Petty and Graunt. It also includes calculations

[578] NA MS T.64/302, ff.3-4.

[579] NA MS T.64/302, f.5.

[580] NA MS T64/302, ff.11-12v.

[581] NA MS T64/302, unfoliated.

[582] NA MS T64/302, unfoliated.

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that may have exceeded even King's broad definition of political arithmetic, such as some "Computations of Horses and Men Running"[583] and an engaging "Computation of the No. of Great and Small Flowers to be wrought in Mrs Kings fine Callico Gown Begun by Mrs Mince... Tuisd[ay]-noon 17 Apr 1711."[584] King's political arithmetic could calculate the number of people who populated the kingdom or the number of flowers that populated a gown. What mattered was that it was equally reliable, equally accurate, in either case.

The Art of Reasoning by Figures

As rich as the evidence is for Gregory King's concept of political arithmetic, it was left to his friend Charles Davenant to clearly, explicitly and self-consciously articulate a definition of and a rationale for political arithmetic as a putatively impartial methodology. Davenant was something new in political arithmetic: a career bureaucrat. Though he held no post (despite vigorous effort) in the 1690s, he had been an Excise Commissioner between 1678 and 1689 and, under Anne, would become first Secretary to the Commissioners for the Union with Scotland and then Inspector-General of Imports and Exports.[585] Davenant's clearest statement on

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[583] NA MS T64/302, unfoliated. This recalls some of Petty's comparisons in the *Discourse Concerning Duplicate Proportion*, which King had read (see above). The paper contains, on one side, a table of times taken by men and horses to run certain distances, and on the other, some anecdotes about men who could outrun horses over short distances.

[584] NA MS T64/302, ff.9-10.

[585] The most thorough study of Davenant is still D.A.G. Waddell's unpublished Oxford D.Phil. thesis, "The Career and Writings of Charles Davenant (1656-1714)" (1954); see also Waddell, "Charles Davenant (1656-1714): A Biographical Sketch", *Economic History Review* 2nd series, 2:2 (1958), 279-288; Kustaa Multamäki, *Towards Great Britain: commerce and conquest in the thought of Algernon Sidney and Charles Davenant* (Tuusula, 1999); Hoppit, "Political Arithmetic"; Andrea Finkelstein, *Harmony and the Balance: An Intellectual History of Seventeenth-Century English Economic Thought* (Ann Arbor, 2000), 219-246 (which gives biographical details 222-223).

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political arithmetic came in an essay "Of the Use of Political Arithmetick, in all Considerations about the Revenues and Trade", the first of his *Discourses on the Publick Revenues, and On the Trade of England* (1698).[586] This was not only the first printed explanation of "political arithmetic" as a technical term, but also the first attempt to account for its origins and progress in political context. Signally, Davenant tied the failures of Petty's early political arithmetic to the political circumstances of its production and the commitments of its author, thereby lending a more explicitly moral force to the stress on disinterestedness and accuracy affirmed in more restrained terms by King. Immensely influential for later practitioners and scholars alike (it is virtually the only contemporary definition of political arithmetic ever quoted in works on the history of political economy),[587] Davenant's essay is the logical endpoint for the present discussion of the meaning of political arithmetic after 1688, and a fitting prelude to a consideration of the broader political context against which this new meaning should be seen.

Davenant's definition, like King's application, was at once fairly general with respect to content and fairly specific with respect to method: "By Political Arithmetic," he wrote, "we mean the Art of Reasoning, by Figures, upon things relating to Government."[588] Before elaborating on this, Davenant jumped directly into an account of political arithmetic's history, crediting Petty with the invention of the term and the first use of the method for its present purposes:

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[586] Davenant, *Discourses on the Publick Revenues, and on the Trade of England* (London, 1698), 1-35.

[587] See for example Holmes, "Gregory King", 286; Phyllis Deane, *The State and the Economic System* (Oxford, 1989), 23, attributes Davenant's definition to "Petty and his followers".

[588] Davenant, *Discourses on the Publick Revenues*, 2.

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> The Art it self is undoubtedly very ancient; but the Application of it, to the particular objects of Revenue and Trade, is what *Sir William Petty* first began, who as yet has been followed by very few: he first gave it that Name, and brought it into Rules and Method[.][589]

Davenant, again like King (in some cases *via* King), was familiar with *Political Arithmetick*, the *Treatise of Taxes* and Petty's works on population (many of which went under the name of political arithmetic), but he was unfamiliar with the political-arithmetical manuscripts. He therefore saw no difference between his political arithmetic and Petty's, in formal terms. Practice was another matter. Petty's numbers (as Davenant knew from King) were manifestly inaccurate. In short, Petty had been doing what Davenant was now doing, but Petty had not done it very well.

Davenant's history of political arithmetic was simultaneously an account of Petty's shortcomings and an argument for the sort of impartiality exemplified above by King and here by Davenant himself: in a sense it was less about what political arithmetic *was* than about how it should be practiced. Davenant began mildly, acknowledging that the limitations with which Petty had had to contend were the inherent faults of his age in general and of his sources in particular:

> The Foundation of this Art is to be laid in some competent Knowledge of the Numbers of the People: And in all his [i.e. Petty's] Inquiries, he took for Guides the Customs, Excise and Hearth-Mony, and the Accompts of those Revenues were not fully stated, and their Produce was not known, at least to him, when his Books were written.[590]

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[589] Davenant, *Discourses on the Publick Revenues*, 2.

[590] Davenant, *Discourses on the Publick Revenues*, 2-3.

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It was no fault of Petty's that he had written when he did.[591] But the consequences for him and his followers were unfortunate, for "the very Grounds upon which he built his Calculations, being probably wrong, he must... be mistaken in his Superstructure".[592] Nevertheless Davenant initially expressed confidence that Petty's

> excellent Wit would have carry'd it very far, if he had liv'd to this Time; for his skilful Hand did all along want right Materials to work upon, with which he might have been furnish'd, by the variety of new Taxes that have been levied in this Kingdom.[593]

In these early pages, Petty appeared as the visionary genius ahead of his time, Copernicus to Davenant's Galileo.

After a few pages, however, Davenant's tone subtly but abruptly changed. The reasons for this are not obvious, but they throw a good deal of light on Davenant and his conception of political arithmetic. Petty, it now turned out, had not been a simple victim of circumstance:

> But, through the whole Course of his Writings, it may be plainly seen, by any observing Man, that he was to advance a Proposition, not quite right in itself, but very grateful [i.e. pleasing] to those that govern'd.[594]

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[591] Davenant evidently knew – possibly from King, possibly from the Shelburne's preface to the 1690 edition of *Political Arithmetick* – that Petty wrote *Political Arithmetick* before the late 1670s (King thought it was written in 1676 – see above), and thus without recourse to information generated by revenue farms later in the decade; see *Discourses on the Publick Revenues*, 3-4.

[592] Davenant, *Discourses on the Publick Revenues*, 4.

[593] Davenant, *Discourses on the Publick Revenues*, 2.

[594] Davenant, *Discourses on the Publick Revenues*, 5.

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According to Davenant, virtually the whole argument of *Political Arithmetick* (an argument to which Petty had fatally subordinated the limited evidence at his disposal) had been designed to flatter the lazy vanity of Charles II:

> The Growth of the *French* King, and chiefly of his Naval Power, was a very unpleasant Object, for the Parliament, and the People of *England* to contemplate; and no doubt it did disquiet the Mind of King *Charles* II. But this Prince, delighting to be sooth'd in his Ease and Pleasures, and to have no anxious Thoughts, was very glad to see one of Sir *William Petty's* Repute for Calculations of this Nature, affirm,[595] That France exceeded England very little in Territory; That we came near 'em as to the Numbers of Men; and that our Numbers were as effectual in point of Strength... That France was under a Natural and Perpetual Impediment of being Powerful at Sea;[596]

and so on. Davenant wavered between attributing Petty's inaccuracies, as King seemed to have done, either to misplaced patriotic zeal ("Every good Englishman does undoubtedly wish all this had been true"), or to the dark arts of the courtier ("he rather made his Court, than spoke his Mind").[597] But, writing in the context of a long and very costly war with France,[598] Davenant was in no doubt about the doleful effects these inaccuracies had had:

> The King was well pleas'd to be lull'd asleep by a flattering Council... For it excus'd his Breach of the Triple Alliance [i.e. with the United Privinces and Sweden against France] and all the other Measures which have since prov'd so pernicious to the Interest of *England*.[599]

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[595] Here Davenant begins marginal page references to the 1690 edition of *Political Arithmetick*.

[596] Davenant, *Discourses on the Publick Revenues*, 5.

[597] Davenant, *Discourses on the Publick Revenues*, 6.

[598] Davenant's first major printed work, which appeared three years before the *Discourses*, was *An Essay upon Ways and Means of Supplying the War* (London, 1695).

[599] Davenant, *Discourses on the Publick Revenues*, 6.

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The present generation was paying the price for this lassitude.

Perhaps it does not go without saying that Davenant's picture of Petty was, historically speaking, seriously flawed. Petty *did* pay court to successive regimes, and actively sought to influence policy, which often meant accommodating himself to the prejudices of his patrons. His numbers *were* subject to increasing levels of doubt as more comprehensive sources became available. And, from the vantage point of the Nine Years War, many of his conclusions about French weakness must have seemed exaggerated if not hallucinatory. Yet there is room for doubt about Davenant's account of Petty's motives, and, more to the point, about Davenant's own motives. In the first place, there is little sign that Petty's estimates had any share in determining Charles II's policy towards France. In the second, Baron Shelburne (Petty's son, admittedly) had offered an alternative account in the preface to the very edition of *Political Arithmetick* Davenant used, in the course of explaining why Petty had not printed *Political Arithmetick* himself. "Had not the Doctrins of this *Essay* offended *France*," Shelburne had written, "they had long since seen the light, and had found *Followers*[.]"[600] Whether or not Shelburne's account is true,[601] what matters here is its relationship to Davenant's. They agreed on the obvious point that Petty's arguments downplayed the threat posed by France, and in further regarding Petty as unwilling to offend Charles II. But for Shelburne it was precisely Petty's view of France that seemed likely to *displease* Charles, at a time when Charles pursued good

[600] Petty, *Political Arithmetick*, epistle dedicatory by Charles Petty (Baron of Shelburne); see Hull's comments, *EW*, 237-238.

[601] I have argued in Chapter 3 that it is not.

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relations with Louis XIV. According to Davenant, Petty wrote what he wrote to please the king; according to Shelburne, Petty suppressed what he wrote to avoid offending the king. For Shelburne, Petty had sacrificed fame and followers to his sense of duty; for Davenant, Petty had sacrificed his integrity to royal whim, falsifying his work and invalidating that of any who followed him too closely.

Neither view was *a priori* more plausible than the other. More important, neither was based on knowledge of Petty's publication strategies, much less his or Charles II's mental states. Shelburne's contention that Petty hid his work from the press to avoid giving offense was simply wrong. *Political Arithmetick* would hardly have offended popular opinion, which ran high against France at the moment it was written, and the high officials whom it might conceivably have worried were precisely the people whose attention Petty had wanted most: the King and his ministers in England, the Lord Lieutenant and his associates in Ireland. On the other hand, Davenant's portrait of Petty as the servile flatterer of an insipid monarch hardly fits with Petty's consistent advocacy of complicated and ambitious policy schemes. Petty's utter willingness to try the patience of his superiors is well (and colorfully) documented in the correspondence of successive Lords Lieutenant and members of the Privy Council, and his own correspondence attests more than adequately to his frustration with official stupidity. In rejecting Shelburne's account and substituting his own, then, Davenant was not setting the record straight about Petty – he knew no more about Petty than Shelburne did – but appealing to present circumstances and prejudices about the character of the court in the recent past to make a point about the practice of political arithmetic.

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Davenant had begun his 1695 *Essay upon Ways and Means of Supplying the War* with an indictment of the erroneous "Opinion... That the War [with France] could not last" but would end with a quick English and Allied victory. This opinion found a footing among high and low alike through "the vanity, natural to our Nation, of over-rating our own Strength, and undervaluing that of our Enemies."[602] The intervening years had shown the futility of such "Extravagant hopes".[603] Now, in 1698, Davenant advanced political arithmetic as a tool by which these same miscalculations might be avoided – an essential instrument of government:

> The Abilities of any Minister have always consisted Chiefly in this Computing Faculty; nor can the Affairs of War or Peace, be well manag'd without reasoning by Figures, upon Things.[604]

Yet, paradoxically, the misapprehensions Davenant castigated, and which his political arithmetic sought to correct, were themselves the product of the earlier, apparently foundational, political arithmetic of Petty's *Political Arithmetick.* In adopting the label of political arithmetic and the professional identity of the political arithmetician, Davenant at once appealed to and distanced himself from his predecessor.

Petty's vision and status had to be acknowledged; but his poor practice and erroneous conclusions had equally to be disavowed, even denigrated. It was not enough, in the end, to talk about the limitations of Petty's sources, because Davenant's sources had their own limitations, which, in order to convince his

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[602] Davenant, *An Essay upon Ways and Means of Supplying the War* (London, 1695), 1.

[603] Davenant, *An Essay upon Ways and Means*, 2.

[604] Davenant, *Discourses upon the Publick Revenues*, 6-7.

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audience of his own good practice, he was compelled to disclose. King (himself one of Davenant's major sources) had been careful to say that he came "very near the truth", but noted that

> since the attaining thereof... is next to impossible, we must content ourselves with such near approaches to it,, as the grounds, we have to go upon, will enable us to make.[605]

Davenant was similarly cautious, even skeptical. He compared political arithmetic to deciphering a code from a handful of clues:

> In the Art of Decyphring, 'tis said where three or four Words, perhaps Letters, can be found out, the whole Cypher may be discover'd; in a great measure, the same holds, in the Computations we are treating of: And very probable Conjectures may be form'd, where any certain Footing can be found, to fix our Reasoning upon.[606]

Political arithmetic was, in the nature of things, a probable science. It was important for Davenant's credibility and the future of his political arithmetic that probable knowledge be seen to be derivable from partial evidence using the method he advocated. Yet Petty himself, who had invented the method and had possessed "an excellent Wit" and a range of evidence, had drawn conclusions that could not be described as remotely probable without imperiling the status of any conclusions Davenant's application of the same method might produce. Either the method or the practitioner was compromised. If political arithmetic, practiced impartially, was truly

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[605] King, *Natural and Political Observations*, 31.

[606] Davenant, *Discourses upon the Publick Revenues*, 11.

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a valid method, Petty must have been guilty of a fatal partiality. Davenant saw this and wrote accordingly.

Political arithmetic after 1688

Davenant's political arithmetic was not a program but a practice. Concretely, it purported to tie certain types of numbers to certain aspects of politics and society. In this respect it served to codify many of the guiding assumptions of mercantilist economic ideas:[607] the central importance of population; the natural ratio of population to land, the relation of both to trade, the relation of all to national strength.[608] These relationships had been identified by many earlier writers – not only Petty in his published work, but his rivals Benjamin Worsley and Roger Coke, more celebrated contemporaries such as Josiah Child, William Temple, and many others, stretching back, arguably, to the early seventeenth century.[609] In this sense, the actual content of much of the so-called political arithmetic of the 1690s has more in common with the trade pamphlets of Thomas Mun and Josiah Child than with Petty's idea of political arithmetic.[610] But the conception of political arithmetic is another matter. It embodied the rhetoric of disinterestedness, maximal probability, and

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[607] The term "mercantilism" is contested, to say the least, but for present purposes Waddell provides a working definition that adequately links Davenant to earlier writers: "If the regulation of foreign commerce, home manufacture, shipping and domestic consumption be Mercantilism, then surely Davenant was a true Mercantilist." See Waddell, "Charles Davenant", 105.

[608] See for example Davenant, *Discourses upon the Publick Revenues*, 10-11.

[609] See Joyce Appleby, *Economic Thought and Ideology in Seventeenth Century England* (Princeton, 1978).

[610] Appleby, *Economic Thought*, comments on this apparent reversal. Davenant himself, like Mun and Child before him, was deeply engaged in debate over the status of the East India Company – see Waddell, "Charles Davenant", 139-166.

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precision – of lack of context – that increasingly characterized the economic writing as well as the scientific work of the late seventeenth and early eighteenth century.[611]

The conception of political arithmetic Davenant articulated was also, above all, a bureaucratic conception. Political arithmetic was detached from any specific times, places or people, and the political arithmetician was constituted as a professional identity that grouped a set of skills in manipulating mostly numerical information, rather than an expertise based on any particular experience. Petty's particular experiences, which in his own time had established him as an expert on Ireland and were, in a political sense at least, the foundation on which he built his political arithmetic, now represented a liability in that they tied him, and his method, to particular interests. Davenant's political arithmetic, by contrast, derived its epistemological credit not from any aspect of Davenant's identity, experience or interests, but from the fact that all such considerations were wholly irrelevant. Its functions were routine and impersonal. It was a neutral tool of government, which was itself envisioned as an act of calculation. As politics was increasingly seen as a matter of numbers, in political arithmetic it was increasingly the numbers that mattered. And as policy-making centered less and less on the shadowy comings and goings of a handful of courtiers and more and more on Parliamentary party politics, political arithmetic evolved into a language that could be learned and used by anyone, in or out of power, to advance or to critique any policy – and to do so in print, for all

[611] See Barbara Shapiro, *A Culture of Fact: England 1550-1720* (Ithaca, 2000).

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to see.[612] Davenant turned to it as a disgruntled out-of-office Tory, but he held to it as Queen Anne's Inspector-General of Imports and Exports.

John Brewer's well-known account of the rise of the bureaucratic fiscal-military state in England (and later Britain) after the Revolution of 1688-1689, beginning in particular with William III's commitment of English resources to a large-scale continental war, indicates the political imperatives that shaped and raised to prominence the new political arithmetic.[613] The limited literature that exists on political arithmetic frequently identifies the period between William's accession and the death of Anne (Gregory King died in 1712 and Davenant in 1714) as political arithmetic's "golden age," and there is some substance to this.[614] Gregory King, though he printed nothing, may have contributed to the 1695 Marriage Duty Act, which realized a longstanding pet idea of populationist writers by taxing bachelors for not contributing to the increase of population.[615] Davenant was a living example of political arithmetic in government, if not at the highest echelons of power: by the time he turned to political arithmetic, he had spent over a decade in one part of England's burgeoning fiscal bureaucracy and would enter another with the return of the Tories

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[612] On this transition, see Peter Buck, "Seventeenth-Century Political Arithmetic: Civil Strife and Vital Statistics", *Isis* 68:1 (1977), 67-84; Buck, "People Who Counted: Political Arithmetic in the Eighteenth Century", *Isis* 73:1 (1982), 28-45. The lapse in 1695 of the Licensing Act, the cornerstone of government censorship of the press, undoubtedly helped to make political arithmetic a public language.

[613] See John Brewer, *The Sinews of Power: War, Money, and the English State, 1688-1783* (London, 1988).

[614] See Hoppit, "Political Arithmetic"; Holmes, "Gregory King".

[615] His papers in the National Archives include "A Probable Calculation of the Annual Income To be raised by a Tax on Marriages, Burials, and Legacies", endorsed on the back as "Fryth's Project of the Duty on Marriages Births and Burials" (NA MS T64/320 ff.2-3v). See Brooks, "Projecting, Political Arithmetic and the Act of 1695"; Paul Slack, *From Reformation to Improvement* (Oxford, 1999), 103; Slack, "Government and Information".

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to power under Queen Anne. In the *Discourses on the Publick Revenues* he championed political arithmetic on the basis of its usefulness in assessing national fiscal-military capacity with particular reference to what would later be known as the Nine Years' War. Geoffrey Holmes, with Davenant in mind, sums this view up:

> [A]s late as 1688 [political arithmetic's] distinguished practitioners had been few. However, over the next six or seven years what had started as a largely academic study received the stamp of deadly earnestness from the War of the League of Augsburg.[616]

In fact, political arithmetic had been no less "earnest" (and certainly no more "academic") in the 1670s or 1680s than in the 1690s. Further, although circumstances had certainly changed after 1688, Davenant's own trajectory is symptomatic of a much broader and longer-term trend towards institutionalization and bureaucratization that had begun before 1688. Petty's own manuscripts abound with designs for Offices of Address and Councils of Plantations and applications for jobs of his own design that would have allowed him to gather and manage the vast amounts of information his schemes would, in practice, have required. More important in the long run was the real development, throughout the second half of the seventeenth century, of an institutional infrastructure within which political arithmetic as defined by Davenant made sense. The events of William's reign undoubtedly accelerated this growth, but its origins predated the Revolution of 1688 and perhaps even the Restoration of 1660. The Council of Trade and Plantations, for example, while it existed in a stable state from 1696, was preceded by the Lords of Trade (1675-1696), itself preceded by the Councils of Foreign Plantations of 1670 and 1672

[616] Holmes, "Gregory King", 285.

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whose work overlapped that of the even older Council of Trade – a tangled chain that could be traced back even further, to Cromwell's regime at least.[617] During the Restoration and the 1670s, however, the fate of a council was bound up with the fortunes of the personality or personalities that dominated it. Petty's evident lack of contact with the Plantation Councils of the 1670s may be attributed to the fact that his old nemesis Benjamin Worsley was Council Secretary,[618] and that despite Ormond's presence, Lord Ashley (later Earl of Shaftesbury), Worsley's new patron, dominated the Council. With Ashley's fall from royal favor in 1674, the Council's commission was revoked.[619] The crucial difference in the 1690s was that the sort of institutions which might practice an abstracted political arithmetic were detached from individual personalities, just as political arithmetic itself was detached from the figure of Petty and the problems of Ireland.

Ireland untransmuted

With transmutation a forgotten preoccupation of neglected manuscripts, and political arithmetic abstracted into a neutral analytical tool, the intimate relationship that had existed between Petty's political arithmetic and the problems of cultural difference in Ireland was necessarily severed. But even if Petty's transmutative political arithmetic could have survived, political changes had rendered it irrelevant. The "bloodless revolution" of 1688-1689 stopped being bloodless as it passed into

[617] The only comprehensive history of these councils is C.M. Andrews, *British Committees, Commissions and Councils of Trade and Plantations, 1622-1675* (London, 1908).

[618] Worsley, a Dissenter, was forced out of office by the Test Act and replaced in September 1673 by John Locke; Andrews, *British Committees*, 107.

[619] Andrews, *British Committees*, 111.

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Scotland and especially Ireland; Jacobite defeats at the Boyne in 1690 and Aughrim in 1691 sealed the political fate of the Catholic Irish and marked the being of a century-long Protestant Ascendancy. No previous "conquest" was so complete. The Cromwellian Settlement of 1652 was harsher on paper than the Treaty of Limerick, but with the Restoration many Catholics loyal to the Crown had won concessions, and by 1687 it had seemed as if the entire settlement might be repealed. In 1690 the Irish Catholic political nation had thrown in its lot with James II, and had lost everything. Petty's political arithmetic, intended as a way to remove differences and effect a union of English and Irish, had been predicated on the brute facts of Catholic Irish numerical strength and, to a lesser extent, political connections. In 1692 the threat was disposed of and the connections destroyed. The rationale for concession was gone.

Political changes were accompanied by conceptual changes, in this case by the triumph of a particular conceptualization of the Irish which Petty, among others, had contested. Petty's project of transmutation had presupposed that the boundaries between English and Irish were mutable, and in general that cultural categories were fungible things. In this he drew on earlier writers like Spenser and Davies; but he also opposed the harder-line view that the Irish were inherently barbarous, incapable of improvement (or at any rate, not worth improving), and could not safely be assimilated but ought to be exterminated or otherwise removed. This was the crux of the debate over the transplantation into Connaught in the 1650s – in which Petty took part – and, no less than Petty's view, had a long pedigree. In the wake of yet another Irish war in which religious and political identities had seemed to fuse more than ever

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before, few English or Irish Protestants were ready to make the subtle distinctions between different groups of Irish Catholics that were essential to conciliation. Catholic Ireland existed in many Protestant minds as an undifferentiated, dangerous mass.

Though Petty's transmutative political arithmetic effectively disappeared after 1687, some comments that survive from the middle of that year are a good indication of the sort of reaction his ideas would have elicited had they been available. Sir Richard Cox, Lord Chief Justice of the Common Pleas in Ireland and future Lord Chancellor,[620] must have been one of the last people to read and respond to the manuscript of Petty's *Political Anatomy of Ireland*, and his criticisms, which he penned in a letter to Robert Southwell in June of 1687, remain with Southwell's copy of Petty's work.[621] Cox's critique extended to Petty's proposal for transmutation as adumbrated in the manuscript, and revealed what transmutative political arithmetic looked like to one who did not share Petty's preconceptions about the Irish. Cox's comments foreshadowed much of the criticism Petty would endure after death, especially with respect to various crucial numbers – mostly revenue or demographic estimates, but also the number of Protestants killed in the Ulster Rebellion of 1641, which Cox (following the rabidly anti-Catholic John Temple) insists was 166,550.[622]

What most stands out, however, is Cox's surprisingly engaged comment on Petty's proposal for transmutation via "exchange of women":

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[620] On Cox's career see S.J. Connolly, *Religion, Law and Power: The Making of Protestant Ireland 1660-1760* (Oxford, 1992), 61-62.

[621] Cox to Southwell, 17 June 1687, in BL MS Add. 21127, ff.53-54v.

[622] BL MS Add. 21127, f.53.

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> The expedient of Transmutation is mistaken in the Sex, for if a million of Women were married to as many poor Irish, it is certain they would degenerate into meer Irish & that in a few Years, experience proves my Assertion, besides in reason it must be soe, for women unless elevated by education & a principle of honour are less virtuous than men, that is they are more easy, & sooner allured by temptation or frightned by any thing that is terrible, they are naturally more slothfull, & love their ease, besides the Irish naturally Lord it over their wives, & are not so uxorious as we English[.][623]

The un-uxoriousness of the Irish was a standard observation of less charitable English writers on Ireland from the late sixteenth century at least. Equally venerable and more interesting is Cox's assertion of the importance of education for virtue, an important aspect of the humanist strain of writing about the transformation of Ireland, but one that Petty had *not*, by and large, picked up. Because he conceived the transformation of Ireland in terms of instilling English virtue, and located virtue in education and therefore chiefly in men, Cox primly dismissed Petty's proposal as mistaken. Petty, on the other hand, conceived the problem not in terms of supplying absent virtues but reconciling opposed interests. If Irish men had English houses, English wives and, eventually, English children, they would identify with English interests. In the space of a generation even differences in habit and behavior would disappear. This would work because, interests aside, the Irish and the English were essentially alike in their motivations. For Cox, however, the difference was between civilization and barbarism; if the gap were to be bridged, it would be by older methods. Even then, there was always the threat of degeneration if too much contact occurred too soon.[624]

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[623] BL MS Add. 21127, f.54.

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More likely, the gap would not be bridged at all. Even so unusually game a critic as Cox lost patience with Petty's too-clever distinctions between the various interest-groups involved in the politics of the settlement. Frustrated with Petty's proposals for dealing with the "vested" Irish (those Catholics who had not lost their lands in the Cromwellian or Restoration Acts of Settlement), who still identified their interests with the "divested" (those who had), Cox lumped all together:

> If the Irish that are vested take part with the divested (as our author says) then the true distinction of factions is English & Irish or rather Papist & Antipapist & not vested & divested: and indeed since there are not above 3000 freeholders in Ireland the Notions of vested & divested cannot denominate factions that are more generall and 100 times more Numerous.[625]

In other words, the only distinction relevant in dealing with Ireland was the simultaneously confessional and national distinction between English Protestants and Irish Catholics. That this either flatly folded Old English Catholics into the Irish camp and Ulster Scots into the English (as Petty himself tended to do when discussing Irish population in broad terms) or ignored such complexities altogether was, in part, the point. A situation that had been layered in shades of grey in the 1660s and 1670s was quickly resolving itself into black and white: those who supported the settlement –

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[624] Cox did briefly entertain the idea of meeting Petty halfway (BL MS Add. 21127, f.54):

> [I]f a number of young boys were exchangd yearly, it would doe what our Author designs, for boys bred after the English manner would not marry but with women soe bred, wherefore the Irish women would betake themselves to English service to qualify themselves for such husbands.

In the context of the letter, this looks to me like a thought-experiment justifying Cox's initial response to the idea of exchanging women, rather than a real proposal for the exchange of young men. He certainly never revisited the idea in his own long public career.

[625] BL MS Add. 21127, f.54.

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under threat at the very moment Cox wrote – and those who opposed it; loyal subjects and rebels.[626]

This view was quickly confirmed in the following years by prominent members of the Irish Protestant governing elite, including Cox himself, who traveled to Ireland in 1690 in William's entourage and became Lord Chancellor in 1703. In 1689, after William's assumption of control in England, but before the invasion of Ireland, Cox anonymously printed *Aphorisms Relating to the Kingdom of Ireland*,[627] a brief tract on English regal sovereignty in Ireland and the best way for William to take the island back. "Ireland is part of the Dominions of *England*, and a Kingdom subordinate to it", Cox wrote, "Whoever hath the Crown of *England*, is *ipso facto* Soveraign of *Ireland*; and to levy War against such Person, is Treason." The text rings with phrases that could have been written ninety years or a century before: the full resources of the state must be committed; "All private undertakings are in vain";[628] most of the Irish, once beaten, "will turn Tories";[629] the Protestants are an "English Colony" in the country.[630] At the root of the problem is "the difference of Humors, Manners and Customs between them and us", as well as an undying resentment at the initial English conquest of Ireland under Henry II in 1172.[631] This

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[626] Or, as Petty put it in a thought-experiment of his own, "Rebells & Slaves"; see the paper of the same title (1686), BL MS Add. 72882, f.92.

[627] [Cox, Richard], *Aphorisms Relating to the Kingdom of Ireland, Humbly submitted to the Most Noble Assembly of Lords & Commons at the Great Convention at Westminster* (London, 1689).

[628] Cox, *Aphorisms*, 6.

[629] Cox, *Aphorisms*, 6.

[630] Cox, *Aphorisms*, 1.

[631] Cox, *Aphorisms*, 3.

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up-to-the-minute call to arms (Cox proposed an invasion force of 20,000) evinced the same view of the Irish as recalcitrant barbarians, unalterably opposed to the English, that lay behind the harsher comments of Spenser and Davies and most of Barnaby Rich, John Temple and Gerard Boate. After the Treaty of Limerick, and more especially from the mid-1690s, men of this viewpoint would govern Ireland.

From transmutative union to colonial system

The longstanding debate over whether Ireland in the early modern period was a kingdom or a colony can be answered with a double affirmative: politically, Ireland was a (usually subordinate) kingdom; economically, it was a colony, run as much as possible in the interests of England.[632] One might crudely divide the old, transmutative political arithmetic from the new, analytical sort along the same lines. Petty had sought to resolve one of the greatest political and cultural problems of the Stuart multiple monarchy: the existence of different nations within one awkwardly compound state. Davenant and his colleagues turned their attention instead to the economic aspects of an expanding imperial state. They envisioned a colonial system that could (especially following the 1707 Act of Union between England and Scotland) coherently place one United Kingdom over a range of colonial possessions in a simple binary. On a conceptual level the Kingdom of Ireland never sat easily in

[632] S.J. Connolly, *Religion, Law and Power*, gives some cogent reasons for seeing Ireland as a kingdom; Nicholas Canny, *Making Ireland British 1580-1650* (Oxford, 2001) for the "colony" view; see Jane Ohlmeyer (ed.), *Political Thought in Seventeenth-Century Ireland: Kingdom or Colony* (Cambridge, 2000); Canny, "The Marginal Kingdom: Ireland as a Problem in the First British Empire", in Bernard Bailyn and Philip D. Morgan (eds.), *Strangers within the Realm: Cultural Margins of the First British Empire* (Chapel Hill, 1991), 35-66; Canny, *Kingdom and Colony: Ireland in the Atlantic World, 1560-1800* (Baltimore, 1988).

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this binary, but in a given context it could be, and usually was, placed on one side or the other without much thought – generally that of the colonies.

This is evident from the few instances where Ireland's subordinate status was seriously questioned. Most prominently, William Molyneux's *Case of Ireland Being Bound by Acts of Parliament in England Stated* (1698), which argued that Ireland, as a kingdom, had never been conquered by England, was therefore not subordinate to England, and need not obey English Acts of Parliament, received a very frosty reception from the political elites on both sides of the Irish Sea. One early response to Molyneux came from the Bristol merchant John Cary.[633] Cary insisted that Henry II had made a complete conquest of Ireland,[634] which was therefore "a Province of the Empire of England"; the English planted there were "a Colony of England".[635] Nowhere was there an Irish authority independent of or equal to the English. Further, the Irish – and here Cary, an Englishmen, lumped Protestants and Catholics together – were unfit for government. Speaking specifically of the Anglo-Irish, Cary wrote that

> they have been us'd to exercise a large Dominion and Power over the Natives, who have been always kept in a servile Obedience and Subjection to them, to a far greater degree than can be practiced in a Country where the People enjoy a more equal share of Liberty[.][636]

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[633] [John Cary], *An Answer to Mr. Molyneux his Case of Ireland's being bound by Acts of Parliament in England, Stated: And His Dangerous Notion of Ireland's being under no Subordination to the Parliamentary Authority of England Refuted; By Reasoning from his own Arguments and Authorities* (London, 1698).

[634] Cary, *An Answer*, 20-37.

[635] Cary, *An Answer*, epistle dedicatory.

[636] Cary, *An Answer*, epistle dedicatory.

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That is, their very experience of colonial government in Ireland disqualified Irish Protestant provincial elite from a say in governing free people (such as themselves).

> Moreover, as they have no Concern in the transacting with Forreign Nations in matters of Government, they may be the less us'd to consider of the Nature and Reason of Political managements, or to think how far it is incumbent upon a Mother Nation or Supream Government, to regulate all her Colonies or Members, so as that the Tranquility of the whole Empire may be best conserv'd[.][637]

Cary expressed particular shock that Molyneux, a man of English blood after all, should so extravagantly have forgotten his place in the imperial hierarchy:

> To assume such an equality with our Superiours as was never granted us, is an Arrogance that might rather have been expected from an *Irish* than an *English* Man.[638]

In general, "*England* must be allow'd to be the Head of this Empire, from whence all its Members do derive their Being, and must depend for their Support and Protection".[639] Whatever restrictions the English Parliament chose to put on the Irish economy in order to pay for this support and protection were simply "declaratory of the Supream Authority, virtually inherent in, and inseparably united to the Imperial Constitution[.]"[640] England was the kingdom; Ireland was a colony.[641]

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[637] Cary, *An Answer*, epistle dedicatory.

[638] Cary, *An Answer*, 15.

[639] Cary, *An Answer*, 72.

[640] Cary, *An Answer*, 73.

[641] Cary, *An Answer*, 140ff.

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Cary had first staked out this position three years earlier, in his *Essay on Trade* (1695)[642] and in a brief correspondence afterwards. The gist of Cary's comments on Ireland in the *Essay on Trade* was that Ireland's growing export trade in cheap woolens was a threat to English producers and ought to be stopped and replaced by linen manufacture, in which England was less competitive.[643] (The irony that Ireland had only developed its woolen trade after the English Cattle Acts had blocked exports of live cattle, "the mainstay of early seventeenth-century Irish trade",[644] was lost on Cary.) Cary went on, however, to assert that the current Irish trade was not only "destructive to the Interest of *England*" but that the remedy – destroying the woolen industry was in *Ireland's* interest.[645]

> Here we must consider, what is the true Interest of *Ireland*, and wherein it doth consist? Whither in Trade and Manufactures, or in Improvement of its Lands by a good Settlement? And I doubt not but on a strict scrutiny it will appear to be the latter[.][646]

This was because Ireland, as a colony, had never yet been populated by sufficient numbers of Englishmen to be considered secure:

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[642] Cary, *An Essay on the State of England, in relation to its Trade* (Bristol, 1695). The sections of the *Essay on Trade* dealing with Scotland and Ireland were printed separately later in the year as Cary, *A Discourse Concerning the Trade of Ireland and Scotland, As they stand in Competition with the Trade of England, Being taken out of An Essay on Trade* (Bristol, 1695; reprinted London, 1696). For ease of reference I have used the latter work, which reprints (in thirteen pages) pages 89-113 of the *Essay on Trade*.

[643] Cary, *A Discourse*, 11-13. Cary suggested this again in *Some Considerations Relating to the Linnen Manufacture in the Kingdom of Ireland* (London, 1704).

[644] Raymond Gillespie, *The Transformation of the Irish Economy 1550-1700*, Studies in Irish Economic and Social History: 6 (Dublin, 1998), 42-43.

[645] Cary, *A Discourse*, 2-3.

[646] Cary, *A Discourse*, 3.

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> Nor is it the advantage of an ill-peopled Colony whose riches are to be the Fruits of the Earth to divert any number of the Inhabitants from its Cultivation, whilst they can find Vent for their Product, and be supply'd with Conveniences another way; had our *American* Plantations done so, they had never been well setled[.][647]

Manufactures took people from the land, leaving it uncultivated and wild. A thinly populated colony such as Ireland – *especially* Ireland, as so much recent and past experience attested – was a threat to the safety of the mother country as well as the colonists themselves.[648] "Nor is there any Reason… why *Ireland* should have more Liberty than our other Plantations".[649]

More important than the ins and outs of Irish wool is the view of Ireland as a plantation, and the view of plantation colonies in general, that Cary articulated. A colonial plantation was not supposed to develop manufactures; it was supposed to cultivate land, perhaps civilize people, and above all supply the mother country, of which it was a fundamentally expendable extension, with "the Fruits of the Earth." To put it another way, plantation status was permanent. For Cary, unlike for Petty, there could be no question of union between kingdom and colony; they were discrete entities, one strictly subordinated to the other. In a thousand years Irish and Americans would still be governed from London and supplied by England, and they would still be husbandmen. This view of a static hierarchy of hard categories comprising a colonial system is often seen as characteristic of "mercantilist" thought,

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[647] Cary, *A Discourse*, 3.

[648] Cary, *A Discourse*, 4-5.

[649] Cary, *A Discourse*, 9.

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and it underlay many applications of the new political arithmetic in the work of Cary as well as Davenant and others. It was diametrically opposed to Petty's view. Petty had encouraged, without much success, fisheries and ironworks on his own Kerry estates, while his wider proposals assumed that Ireland, the American colonies and perhaps parts of Asia and Africa as well might ultimately follow Wales (and Scotland) into an imperial union.

In the 1690s such thinking seems to have been on the wane, particularly regarding Ireland. It is interesting, then, that it found a late champion in the scholar Edmund Bohun, who engaged Cary in a brief correspondence in early 1696.[650] Bohun told Cary that "your Partiality for England has misled you" –

> The trade of the World is now very great but capable to be made much greater, so much greater, that not only England, Scotland, and Ireland may drive all they can without envying each being three sisters under one common father[.][651]

"To make this seeming paradox Plain", Bohun invited Cary on a journey back in time to "observe the Rise and progress of trade and how it had spread from Tyre and Sidon to the East & West Indies and the Discovery of the South Continent[.]"[652] It is not necessary to follow the whole of Bohun's account (he had a well-deserved reputation for loquacity) to see the main point:

> Read but Thucidides of the Ancient state of Greece whilest the Trade was in the hands of the Tyrians, Polybius his account of Spain, Plinys

[650] Cary's letters and other papers are in BL MS Add. 5540. For his correspondence with Bohun see BL MS Add. 5540, ff.59-63v.

[651] Bohun to Cary, 18 January 1695/6, BL MS Add. 5540, f.59.

[652] BL MS Add. 5540, f.59.

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> account of Italy, Caesars of Gaule and Britan, Tacitus of Germany, Saxso Grammaticus of Denmark &c And you will see what naked barbarous People inhabited these countries till they were civilized and taught Manufactures, the Art of War, Navigation and Commerce by the Tyrians, Carthagenians, Greeks and Romans.[653]

There was a thinly-veiled lesson in this for Cary, who had been so ready to denigrate the barbarous Irish. The English themselves had been barbarians once.

> Thus might we have continued to this day if God had not sent the Romans to Civilize us; and by the same means may all America be Civilized too and then here will be trade enough for England Scotland and Ireland at least if not for all Europe.[654]

Behind this alternative history of trade, which was incidentally also a history of plantation, lay a completely different conception of human economic activity – or, in Bohun's case, the absence of such a distinct conception. The civilizing effect of trade and manufactures, Bohun argued, was providentially designed for the spiritual improvement of the entire world. To hinder its progress was not merely counterproductive but against the will of God:

> In short to suppose the trade of the World can be driven by any one Nation how great soever is a very great piece of Ignorance, all monop[o]lies, restraints of trade to companies exclusive of all others are narrow thoughts that spring up in narrow souls and contradict the great Designe of God Almighty which is to civilize the whole race of Mankind, to spread Trade, Commerce, Arts, Manufactures and by them Christianity from Pole to Pole round the whole Globe of the Earth; and therefore I am sure God will blast all those designes that are contrary to his, and ruine those Nations and companys that would ingross his blessings, and joyne with the Devil[.][655]

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[653] BL MS Add. 5540, f.59.

[654] BL MS Add. 5540, f.60.

[655] BL MS Add. 5540, f.59.

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Trade, according to Bohun, was not a matter of mere national interest. It was an engine of human history, civilization and conversion – ultimately a link not only between people but also between mankind and God.

Cary's reply was a good deal briefer. He claimed to admire Bohun's grasp of history, but he doubted its relevance in the present case, asserting simply the basic point he had already made in the *Essay on Trade*: that "all Plantations setled abroad out of our own People must needs be a Loss to this Kingdome except they are imployed there to serve its Interest".[656] The "ends of their first settlement" were not matters of divine drama but simply "to provide materials for the increasing our Trade at home, & keeping our people at work here".[657] About the greater cosmic dimensions of trade indicated by Bohun, Cary had nothing to say. The two were speaking different languages. This did not stop Bohun from speaking, however, and another letter with another lesson in world history followed two weeks later.[658] Bohun briefly engaged Cary on a more practical level, arguing that restrictions on Irish trade would drive the English colonists out. But soon he was roving from Tyre to Constantinople in search of examples. If Cary had not listened to the first letter, he was unlikely to listen to this. No response survives.

There is no reason to think that Bohun ever heard of Petty's schemes, or that he would have approved of them if he did. Though suspected of Jacobite sympathies,

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[656] Cary to Bohun, 31 January 1695/6, BL MS Add. 5540, f.61.

[657] BL MS Add. 5540, f.61.

[658] Bohun to Cary, 15 February 1695/6, BL MS Add. 5540, ff.62-63.

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he was as mistrustful as anyone of Irish Catholics, particularly the "old Planted Popish English" who "hate us most mortally."[659] Yet, like Petty, he saw no permanent distinction between barbarous, unsettled colonies and civilized, settled kingdoms, and he conceived of historical progress as the progress from one to the other. Trade, and economic activity generally, was significant because of the role it played in the great historical processes of cultivating and peopling the earth and civilizing and converting its people. Petty seems to have thought that the first two were more important, at least in the short run, than the last, but the overall worldview in which he situated his political arithmetic and his work on population was similar to Bohun's. Davenant and Cary were different. Their political arithmetic counted everything but changed nothing.

[659] BL MS Add. 5540, f.62.

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Epilogue: From Petty to Marx

Following the twists and turns of political arithmetic through the eighteenth century would require not only another chapter but probably another book, and the story would be very different from the one told here. As Julian Hoppit has written of Davenant's famous definition,

> Political arithmetic was not, it is worth stressing, confined to estimates of national income and population, for it might also explore public finances, economic performance, poor relief, military matters, religious affiliation, social order, and so on. The dimensions of public policy set the agenda and, therefore, the potential subject matter of political arithmetic was unfixed and could change from one period to another. ... Political arithmetic was both thematically and methodologically a broad church.[660]

However multifaceted, it remained fundamentally an *arithmetic*, a method of calculation, from Davenant's seminal definition of it as such to Adam Smith's final, cursory and somewhat dishonest dismissal of it in the work that heralded its superior successor-science, political economy. Having quoted some figures on grain imports and exports in support of an argument against trade restrictions, Smith disposed of their source with a flick of the pen: "I have no great faith in political arithmetic, and I mean not to warrant the exactness of either of these computations."[661] Without the exactness of its computations, political arithmetic – the tradition of analysis understood to have been founded by that greatest of computers himself, Sir William

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[660] Julian Hoppit, "Political Arithmetic in Eighteenth-Century England", *Economic History Review* 49:3 (1996), 517.

[661] Adam Smith (ed. Edwin R. Cannan), *An Inquiry into the Nature and Causes of the Wealth of Nations* ([1776]; Chicago, 1976), 2:42.

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Petty, but licked into shape by King and Davenant – had little to offer. In 1776, if not well before, "the Method of Reasoning by Figures, upon Things relating to Government" was in its death throes. Moreover, any relationship it had to Petty's much grander project of transmuting the Irish into English had vanished, like the scheme itself, long since, and Petty himself had entered on a long career of appearing towards the tail end of lists of seventeenth-century economic writers and men of science, and in footnotes as the source of historical statistics of dubious value.

Yet roughly three quarters of a century after Smith dismissed Petty's invention without mentioning his name, Petty would reemerge in the papers and correspondence of Karl Marx as the "founder" of the political economy Smith supposedly embodied.[662] The resurrection had qualifications, to be sure. Smith wrote political arithmetic out of the history of political economy altogether, and his self-proclaimed successors' creation-narrative of their discipline survives largely intact to this day in the historical reflections of economists, whose professional identity is often articulated more or less explicitly in terms of their reception – positive or negative – of Smith's, Smithian, or "classical liberal" economic ideas. (Studies of "economics before Adam Smith" use the phrase with more or less conscious irony, and tend to dwell on the few ways that Smith's predecessors foreshadowed his achievement and the many more that they fell short.) It is not surprising that it should have been a relative outsider and an avowed critic of classical political economy, Marx, who dug deeper. The results of his decades of study challenged the discipline's understanding of both its contemporary nature and its historical origins. Marx stressed

[662] Marx called Petty "the founder of political economy" in *Theories of Surplus Value*, vol.1 ([1861]; London, 1967), 1.

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the historical contingency not only of the economic arrangements that the classical economists took for natural law, but also of their very way of thinking about those arrangements. Conducting, in a sense, the first "contextual" history of modern political economy, Marx began his story with Petty.

The history of political economy

Just as modern historians of economics have been, Marx was interested in Petty only to the extent that his theoretical contribution to the discipline remained significant. What distinguished his treatment from theirs is the criterion of significance he employed. Whereas more recent authors have tended to straightforwardly assess how Petty's pronouncements do or do not square with accepted theory, Marx was as or more interested in how Petty's comments, given his historical standpoint, reflected the contingency of theories whose claims of universal validity Marx did not necessarily accept. The proper critique of political economy, in other words, was not dogmatic but historicist, rooted in a detailed examination of the origins of political economy. As Marx wrote in early 1852,

> I should in general remark to the democratic gentlemen that they would do better first to acquaint themselves with bourgeois literature before they presume to yap out their contradictions of it. ... Before they try to criticise the criticism of political economy they should try to acquaint themselves with the first foundations of political economy.[663]

[663] Karl Marx to Georg Weydemeyer, 5 March 1852, in Karl Marx and Friedrich Engels (trans. Dona Torr), *Correspondence, 1846-1895: A Selection with Commentary and Notes* (London, 1934) [hereafter *Marx-Engels Correspondence*], 56.

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Marx was no less focused on Petty's "economics" than any commentator since, but it was probably only thanks to the peculiar character of Marx's interest in economics that he looked back beyond Smith and the eighteenth century writers, to Petty. And it is in large part because he did so that Petty's economics are examined today at all.

Marx saw Petty as the founder of a tradition in political economy which reached its apogee in Smith and Ricardo.

> [B]y classical political economy I mean all the economists who, since the time of W. Petty, have investigated the real internal framework of bourgeois relations of production, as opposed to the vulgar economists who only flounder around within the apparent framework of those relations[.][664]

What chiefly linked Petty and these later writers was his understanding of commodities and what amounted to his theory of value. As Marx noted in the *Grundrisse*, the early pages of *Political Arithmetick* had distinguished "very prettily and very naïvely"[665] between ordinary consumable commodities ("wealth, but *hic et nunc*") and gold and silver – money – as "eternal commodities"[666] and hence a medium for the accumulation of wealth over time.[667] What was more important than this distinction (which, as Marx also wrote, could be found in Xenophon),[668] though, was Petty's inkling that just as specific types of labor produced the use-values

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[664] Marx (trans. Ben Fowkes), *Capital: A Critique of Political Economy*, vol.1 ([1867]; London, 1990), 174-175 n.34. This judgement is exactly echoed by one of Petty's recent Marxian commentators; see Alessandro Roncaglia, *Petty: The Origins of Political Economy* (Armonk, NY, 1985).

[665] Marx (trans. Martin Nicolaus), *Grundrisse*, ([1939]; London, 1993), 646.

[666] Marx, *Grundrisse*, 170.

[667] Petty's *Political Arithmetick* is quoted at length in Marx, *Grundrisse*, 231-232. The quotation mentioned above is from Petty, *Political Arithmetick*, 3 (*EW*, 178).

[668] Marx, *Grundrisse*, 170.

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embodied in short-lived commodities, so labor in general lay behind value in general: Petty was thus among "the first economists… to have seen through the nature of value."[669] Specifically, as Marx had said in an earlier letter to Engels,

> Value as such has no other 'material' but labour itself. This determination of value, first indicated by Petty, clearly worked out by Ricardo, is merely the most abstract form of bourgeois wealth.[670]

The insight of classical political economy, however, was also a blindness: "it has never once asked the question why this content has assumed that particular form, that is to say, why labor is expressed in value", and the nature of the transformation between them.[671] Marx's desire to understand this blindness may be may be why Petty's priority in the classical tradition of political economy was more than a piece of historical trivia.

> Political economy, which first emerged as an independent science during the period of manufacture, is only able to view the social division of labour in terms of the division found in manufacture[.][672]

But Petty had written before the rise of large-scale manufacturing, and – necessarily, since he founded it – before classical political economy existed as a discipline. In an aside on the Physiocrats in the third volume of *Capital*, Marx contrasts them with the "mercantilists" who focused on commercial or circulating rather than productive capital, and

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[669] Marx, *Capital*, vol.1, 142 n.18.

[670] Marx to Engels, 2 April 1858, in *Marx-Engels Correspondence*, 106.

[671] Marx, *Capital*, vol.1, 174.

[672] Marx, *Capital*, vol.1, 486.

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> [w]ho in their crude realism form the true vulgar economists of their day and whose practical self-interest pressed the beginnings of scientific analysis by Petty and his school right into the background.[673]

When Petty wrote, his words were not orthodoxy. Further, in his analysis of ground-rent at least, Petty was "closer to the feudal period" than to Ricardo: in the seventeenth century, "the agricultural population are still the overwhelming majority of the nation" and "the landowner still appears as the person who appropriates in the first instance the excess labour of the immediate producers"; "ground-rent is the normal form of surplus value" and "Landed property thus still appears as the chief condition of production."[674] The economic context (the mode of production) in which Petty, his contemporaries, and his immediate successors wrote explained why

> instead of deriving the valorization of capital from the exploitation of labour-power, they explain the productivity of labour-power by declaring that labour-power itself is this mystical thing, interest-bearing capital.[675]

Petty's analysis was important not because he avoided these shortcomings but precisely because he embodied them in their most comprehensible form: "The older writers, like Petty... bring out the capitalist character of the division of labour as applied to manufacture more clearly than Adam Smith does."[676] Petty threw the specificity of bourgeois political economy into relief.

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[673] Marx (trans. David Fernbach), *Capital: A Critique of Political Economy*, vol.3, ([1870]; London, 1991), 920.

[674] Marx, *Capital*, vol.3, 919.

[675] Marx, *Capital*, vol.3, 596.

[676] Marx, *Capital*, vol.1, 486 n.53.

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In reading Petty, Marx combined a mastery of the available sources with a blindness of his own. In various works he cited or quoted Petty's *Treatise of Taxes and Contributions*, *Verbum Sapienti*, *Quantulumcunque Concerning Money*, and, many times, *Political Arithmetick*, and it is quite likely given his impressive research habits and the still more impressive facilities at his disposal (the British Library in London, and Chetham's Library in Manchester) that he had read the entire range of Petty's not particularly voluminous printed work.[677] But, as the foregoing chapters have shown, Petty's printed works are often less than half the story, and it is hard to see how Marx can have read anything more (if he did, it left no trace in his own work).

Further, Marx read what he did with a very specific question in mind: what had Petty to say about labor, value, commodities, money – the basic concepts with which any analysis of economic relations must begin? He located and elucidated Petty's comments on these topics with great efficiency, theoretical brilliance and, what is more, a degree of historical sensitivity uncommon then or since. Once that was done, however, he moved on. What this amounted to was a historicized interpretation of Petty's economic ideas, rather than a historical understanding of Petty himself. Paradoxically, it was Marx's interest in the historical context of Petty's ideas that established the scholarly tradition of reading Petty's works in the light of contemporary economics. It is a great irony that the peculiar nature of Marx's interest

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[677] With the possible exception of the then-recently published documentary history of the Down Survey: Petty (ed. T.A. Larcom), *The history of the survey of Ireland commonly called the Down survey, A.D. 1655-1656* (London, 1851).

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in Petty's economics obscured something else that the two pioneers of political economy had in common: an interest in transforming Ireland.

The perils of union

Petty spent much of his life arguing for the union of English and Irish; though Marx never knew it, bringing this union about was what political arithmetic was invented to do. Marx, meanwhile, sought a rather different and much more famous union of his own: "Working men of all countries, unite!" Given Marx's tightly circumscribed use of Petty in his writings – he nowhere mentions Petty's personal role in Ireland, a remarkable oversight – this juxtaposition looks like a bit of word-play. But if we examine what Marx and Engels had to say about Ireland, there is something more to it than that. Petty tried to reconcile opposed political interests by uniting the demographic groups that embodied them and the composite polity they inhabited. Marx sought to unify an economic class riven by political differences by splitting the polity they shared in two. These are not abstract parallels: both men were talking about Ireland. Petty saw a future Anglo-Irish political union as the institutional backdrop to the transmutative union of English and Irish interests into one; Marx saw the actual Union of 1801 as the institutionalization of inequality between two persistently distinct nations. The union Petty sought to create, Marx sought, for strikingly similar reasons, to destroy.

The history of English colonization in Ireland interested Marx and Engels, both as a matter of practical politics and in a more general way as an example of colonial practice. Following a tour of Ireland in 1856, Engels wrote to Marx that

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> Ireland may be regarded as the first English colony and as one which because of its proximity is still governed exactly in the old way, and here one can already observe that the so-called liberty of English citizens is based on the oppression of the colonies.[678]

He described a country "completely ruined by the English wars of conquest from 1100 to 1850 (for in reality both the wars and the state of siege lasted as long as that)," and how the Irish themselves

> By consistent oppression... have been artificially converted into an utterly demoralised nation and now fulfil the notorious function of supplying England, America, Australia, etc., with prostitutes, casual labourers, pimps, thieves, swindlers, beggars and other rabble.[679]

Over a decade later, he was researching the history of this process of oppression in some of the same sources Petty himself had drawn on as an agent of it:

> Last week I waded through the tracts by old Sir John Davies (Attorney-General for Ireland under James). I do not know if you have read them, they are the main source; at any rate you have seen them quoted a hundred times. ... From these tracts it is clear that communal property in land *still existed* in full force in Ireland in the year 1600, and this was brought forward by M. Davies in the pleas regarding the confiscation of the alienated lands in Ulster, as a proof that the land did not belong to the individual owners (peasants) and therefore either belonged to the lord, who had forfeited it, or from the beginning to the Crown. I have never read anything finer than this plea.[680]

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[678] Engels to Marx, 23 May 1856, in *Marx-Engels Correspondence*, 93.

[679] *Marx-Engels Correspondence*, 94. This echoed Petty's frequent description of English involvement in Ireland as a five-hundred-year war, only recently ended at the time he wrote (e.g. in the fifth chapter of *The Political Anatomy of Ireland*), which in turn echoed Sir John Davies' comments in *A Discoverie of the True Causes Why Ireland was Never Entirely Subdued... until His Majesties Happie Raigne* (1612). Marx and Engels were familiar with both Petty and, to a lesser extent, Davies.

[680] Engels to Marx, 29 November 1869, in *Marx-Engels Correspondence*, 275.

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He added that elsewhere Davies "gives an exact description of the income, etc., of the chief of the clan. These things I have *never* seen quoted and if you can use them I will send them you in detail."[681] Marx responded to the offer: "I have read a lot of *Davies* in extracts. The book itself I had only glanced through superficially.... So you would do me a service if you would copy out the passages relating to *common property.*"[682] Marx and Engels were constructing their own anatomy of Ireland, and using some of the same materials Petty had used in writing his.

What was the meaning of this?

> Irish history shows one how disastrous it is for a nation when it has subjugated another nation. All the abominations of the English have their origin in the Irish Pale. I have still to work through the Cromwellian period, but this much seems certain to me, that things would have taken another turn in England but for the necessity of military rule in Ireland and the creation of a new aristocracy there.[683]

Historically, the exploitation of Ireland had prolonged the life of a backward English regime, and in the present tense it continued to do so. "Ireland is the bulwark of the English *landed aristocracy*," Marx wrote in 1870. "The exploitation of this country is not only one of the main sources of their material wealth, it is their greatest *moral* strength." The English ruling class "represent the *domination of England over Ireland.* Ireland is therefore the great means by which the English aristocracy

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[681] *Marx-Engels Correspondence*, 275-276.

[682] Marx to Engels, 10 December 1869, in *Marx-Engels Correspondence*, 281.

[683] Engels to Marx, 24 October 1869, in *Marx-Engels Correspondence*, 264.

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maintains *its domination in England* itself."[684] Revolution in England therefore required freedom for Ireland:

> *it is in the direct and absolute interest of the English working class to get rid of their present connection with Ireland.* ... For a long time I believed that it would be possible to overthrow the Irish regime by English working class ascendancy. ... Deeper study has now convinced me of the opposite. The English working class will *never accomplish anything* before it has got rid of Ireland. The lever must be applied in Ireland. That is why the Irish question is so important for the social movement in general.[685]

Though they would have been on opposite sides of the question, the idea that the stability of the English ruling class depended on English political control of Ireland was common to Marx and to Petty. For Petty, the answer was a union that would confirm English authority. For Marx, the answer was to remove English authority. "If... the English army and police were withdrawn to-morrow you would at once have an agrarian revolution in Ireland"; "the overthrow of the English aristocracy in Ireland... has as a necessary consequence its overthrow in England. And this would fulfil the prerequisite for the proletarian revolution in England."[686]

Achieving this meant getting English workers to identify their interests with those of the Irish – a goal conceptually very close to Petty's own, though with very different ends in view.[687] But what is even more striking than this conceptual

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[684] Marx to Siegfried Meyer and A. Vogt, 9 April 1870, in *Marx-Engels Correspondence*, 288.

[685] Marx to Engels, 10 December 1869, in *Marx-Engels Correspondence*, 280-281.

[686] Marx to Meyer and Vogt, *Marx-Engels Correspondence*, 288.

[687] See, e.g., Marx to Kugelmann, 29 November 1869, in *Marx-Engels Correspondence*, 278-279.

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convergence of both writers on the notion of a union of interests is the unmistakeable echo of Petty in Marx's analysis of the obstacles to union:

> [E]very industrial and commercial centre in England now possesses a working-class population *divided* into two *hostile* camps, English proletarians and Irish proletarians. The ordinary English worker hates the Irish worker as a competitor who lowers his standard of life. In relation to the Irish worker he feels himself a member of the *ruling* nation and so turns himself into a tool of the aristocrats and capitalists *against Ireland*, thus strengthening their domination *over himself*. He cherishes religious, social and national prejudices against the Irish worker. ... The Irishman pays him back with interest in his own coin. He regards the English worker as both sharing in the guilt for the English domination in Ireland and at the same time serving as its stupid tool.[688]

Marx faced essentially the same problem as Petty. Aritificial divisions articulated in terms of nation, religion or culture ("artificially kept alive and intensified by the press, the pulpit, the comic papers, in short by all the means at the disposal of the ruling classes")[689] obscured a natural identity of interests. But whereas for Petty political union had been an institutional prop for a national and ultimately ethnic union, for Marx the real effect of the Union, at least in conditions of labor mobility, was to maintain ethnic chauvinism even in the teeth of material interest. Petty's answer to national sentiment was an outlandish program of demographic mixture justified by the sovereign power of Leviathan. Marx's answer was an appeal to reason justified in terms of a new international order. Both failed, and both predicted the results of their failure: for Petty, the collapse of the Stuart monarchy; for Marx, the unnatural prolongation of the *ancien régime*. It is tempting to wonder what Marx

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[688] Marx to Meyer and Vogt, *Marx-Engels Correspondence*, 289.

[689] *Marx-Engels Correspondence*, 289-290.

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would have said if he had read Petty's manuscript proposals in addition to his printed books. Petty, at any rate, would certainly have agreed with the last of the "Theses on Feuerbach": "The philosophers have only *interpreted* the world in various ways; the point is to *change* it."

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